June 21, 1956

# The IRON AGE

Special Survey Report

How to Beat the Heat P.89

New Switch: Zone Control Carburizing P.107

Senate: What's Needed In Defense Tooling? P.66

Digest of the Week P–2

ONCE upon a time there was an accounting department that was used to heavy costs to replace worn-out production tools. One month, when they were checking out their figures and preparing cost analyses, part of this cost was missing. Of course this bothered the accounting department because the treasurer of the company needed this cost so he could growl at salesmen when they turned in their expense accounts. They started a systematic check—the kind that only accountants can dream up, and found that the production department had started making a lot of parts out of Copperweld Leaded Alloys—the steels with "built-in productivity." Because of its extreme machinability, they were enjoying not only faster feeds and speeds and high production savings but production tools were lasting much longer—in some cases as much as 10 times as long. The story has a happy ending because everybody was delighted with lower production costs—even the treasurer. He hasn't snarled at a salesman's expense account in months.

ARISTOLOY STEELS

**COPPERWELD STEEL COMPANY**

**Steel Division • Warren, Ohio**

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

For further details on Copperweld Leaded Alloys, write for free booklet, "Lead Treated Steels."

# How Change to High-Strength Bolting Speeded Erection of Steelwork

This 19-story structure in Rockefeller Center's community of impressive office buildings is an addition to the U. S. Rubber Building. It is one of New York's first projects to be erected with high-strength bolting.

It was originally intended to use riveting to join the structural members. After the first story was erected in this manner, it was decided to use high-strength bolting for the remainder of the job, with the result that erection of the 4190-ton frame proceeded more swiftly, at the same time providing stronger joints. Bethlehem High-Strength Bolts were used in connecting many of the structural members.

Bethlehem High-Strength Bolts are ideal fasteners for connecting structural steel. They can be installed quickly by a two-man crew, using a holding wrench and a calibrated impact wrench. What's more, the torque applied by the impact wrench provides joints which stay tight for all time.

Another advantage of high-strength bolting is relative freedom from noise, as the impact wrench is less noisy than a riveting gun. There's no cause for concern about fire hazards, either, for with the bolts installed cold, heating equipment is not necessary.

Bethlehem High-Strength Bolts are made of carbon steel, and are heat-treated by quenching and tempering, so as to meet the requirements of ASTM Specification A-325.

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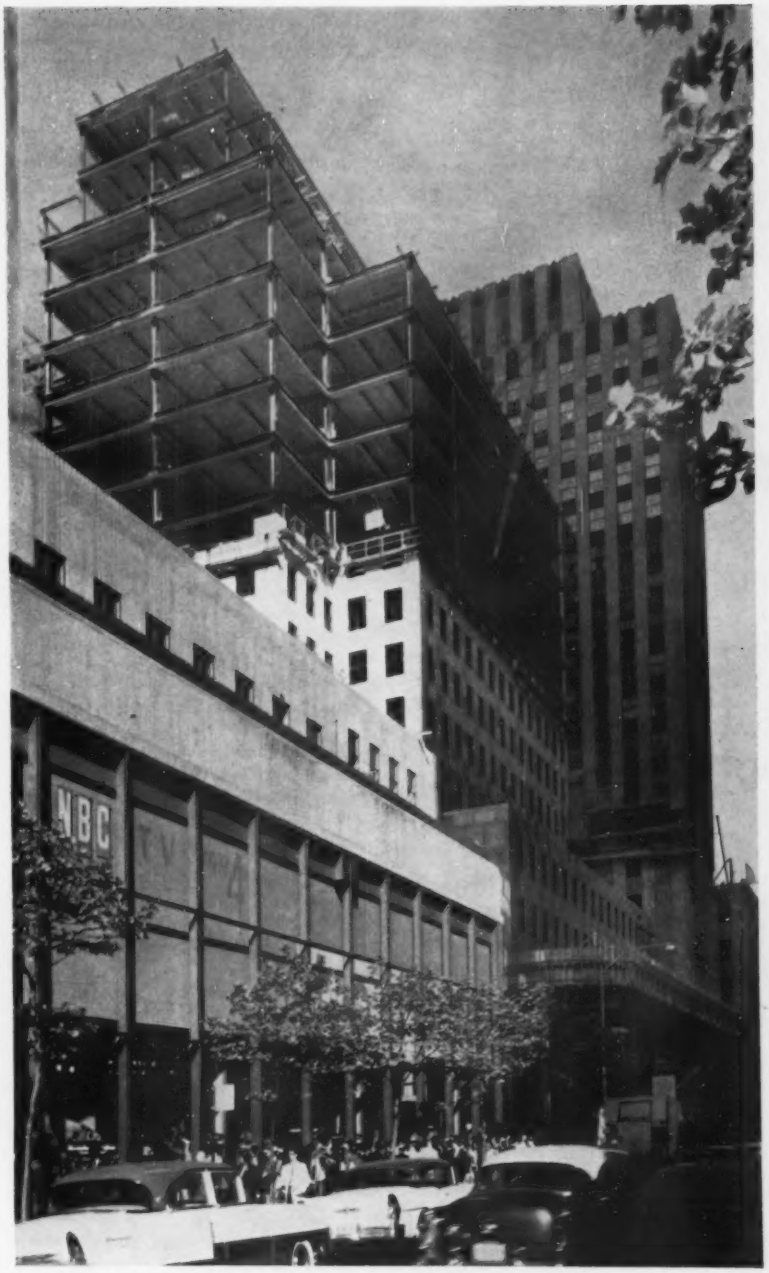
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
*Export Distributor:* Bethlehem Steel Export Corporation




Addition to U. S. Rubber Building, New York City. *Architects:* Harrison & Abramovitz; *General Contractor:* George A. Fuller Co.; *Structural Steel Contractor:* The Ingalls Iron Works Co.; *Structural Engineers:* Edwards & Hjorth.

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

June 21, 1956—Vol. 177, No. 25

The IRON AGE

# Digest of the Week in Metalworking

**Starred items are digested at right.**

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THE IRON AGE, published every Thursday by CHILTON CO., Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

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## NEWS DEVELOPMENTS

**STEEL LABOR TALKS ENTER CRITICAL STAGE** P. 59

**Union rejection of Big Three five-year contract proposal puts steel labor negotiations in "make or break" phase. Union reversion to individual company negotiations poses threat of divide and conquer strategy.**

**ALUMINUM INROADS DON'T WORRY COPPER** P. 62

**Copper producers say they are neither hurt nor worried about the inroads**

**into their markets being made by the aluminum industry. Give several good reasons why, including facts on per capita consumption trends in U. S.**

**CLAD METALS COVER A WIDER FIELD** P. 63

**Many fabricators are finding clad metals valuable in getting two-for-one performance out of their products. Until recently, cladding was almost entirely the domain of kitchenware designers.**

**STREAMLINING MACHINE TOOLS PAYS OFF** P. 87

**Sales glamour isn't the only advantage when toolmakers switch to functional design. Customer usually gets a product easier to operate.**

◀ **HOW TO BEAT THE HEAT** is a major industry problem as summer's hot and humid weather moves in. In this IRON AGE Survey Report to Management, latest industry developments in cooling hot spots, improving hot weather efficiency are discussed. Special feature begins on page 89.

**PLASTICS LOOK FOR THEIR BEST YEAR** P. 64

As they prepare for their best year to date in both production and sales, plastics industry producers gather in New York for National Conference and Exposition. Sales going above $2 billion mark are anticipated. Reinforced plastics offer growing competition to metals themselves.

## FEATURE ARTICLES

**GET TOP QUALITY CARBURIZING WITH ZONE CONTROL** P. 107

Commercial heat treaters have been debating the merits of pack vs gas carburizing for a long time. But gas carburizing in a zone control atmosphere furnace adds a new and important twist. It's fast, continuous, relatively cheap. Applied to high quality gears, the zone control technique is put to the acid test.

**MIDGET DIE STAMPS OUT VARIETY OF PARTS** P. 110

Fifteen different (but basically similar) small stamped parts rattle off this high speed press, thanks to a miniature progressive die. Production rate is now 5000 hourly, vs 600 per hour earlier. Interchangeable punches provide startling flexibility. One press, one operator now handle stamping requirements on all 15 blank designs.

**NUCLEAR ENERGY WANTS BETTER STEELS** P. 112

Metal and alloy makers are often confused about what the nuclear industry wants from them. Misunderstanding about end uses is No. 1 cause. This article by an AEC authority takes a big step toward setting the facts straight. Stainless steel, for example, has a "moderate use" future—but designers want better, stronger grades.

**STANDARDIZED BARREL TUMBLING PAYS OFF** P. 115

Barrel tumbling standards are hard to come by. Many production people simply shrug their shoulders when asked to reproduce blend radii from lot to lot. Yet such uniformity improves the product and cuts finishing costs. Developing standards needn't be difficult. Simply apply known principles to experimental lots. Results can point the way to using as few as two tumbling compounds.

**RUBBER CONVEYORS ADAPT TO CHANGING PLANT NEEDS** P. 118

Bulk handling of materials like coal, ore and sand is still a major use of conveyor belts. But improved materials, ingenuity in adapting various packaged, prefabricated belt conveyors to new problems has greatly extended their usefulness. Today, you can have about what you need.

## MARKETS AND PRICES

**CAN COMPANIES OPPOSE TINPLATE PRICE HIKE** P. 61

Increases in the cost of tinplate are not finding favor with can producers. Countermeasures they plan are switching to blackplate and installing equipment so they may process tin and steel plate from strips.

**HIGH STEEL STRAPPING SALES A GOOD OMEN** P. 65

Record production of strapping, lack of surplus and lots of orders for remainder of year are glad signs. But maybe users are stocking up before steel prices increase. So producers are readying for sales battle in 1957. Number of new pieces of strap handling equipment are scheduled for showing later this year in sales drive.

**URGE MORE MACHINE TOOLS FOR MILITARY** P. 66

Current Senate report blasts Defense Dept., ODM for lack of a forceful machine tool buying program. Nation's defense potential is hampered by not enough good tools in use and reserve.

**AUTO SALES UP: SUMMER'S HERE** P. 76

Last 10 days of May marked start of the long overdue spring buying spree. But even optimists are cautious in predicting how much the record auto inventory will be dented during the summer months.

**STEEL INVENTORY IS MONEY IN THE BANK** P. 163

With steel labor talks entering a critical phase, the company with a good inventory is sitting pretty. Unfortunately, not many metalworking plants are so situated.

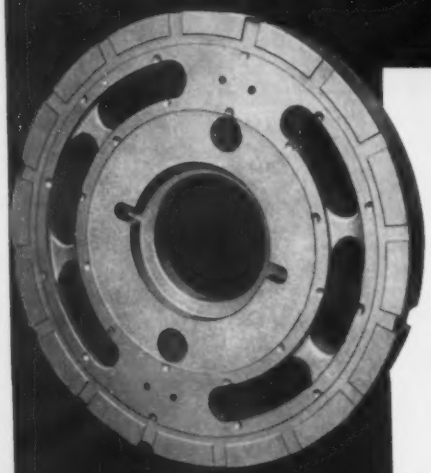
## NEXT WEEK:

**HOW TO GET MORE FOR YOUR FINISHING DOLLAR**

Modern plating shops are up against multiple problems. But in their very complexity lies the seeds for greater cost-cutting. Here's a tip-studded roundup of how platers pare costs, plus cleaning and finishing data.

# SALT BATH HEAT TREATING

# Eliminates Atmosphere Problems



**TYPICAL!**

This Vasco B.B. steel valve plate was a heat treater's "nightmare"—until Ajax salt baths were put on the job. Under conventional heating methods, plates invariably cracked and hardness response was only Rc 52. Martempering and drawing in Ajax baths produced Rc 60-64 . . . without cracks, warping or surface defects.

## Good-bye to scale and decarb!

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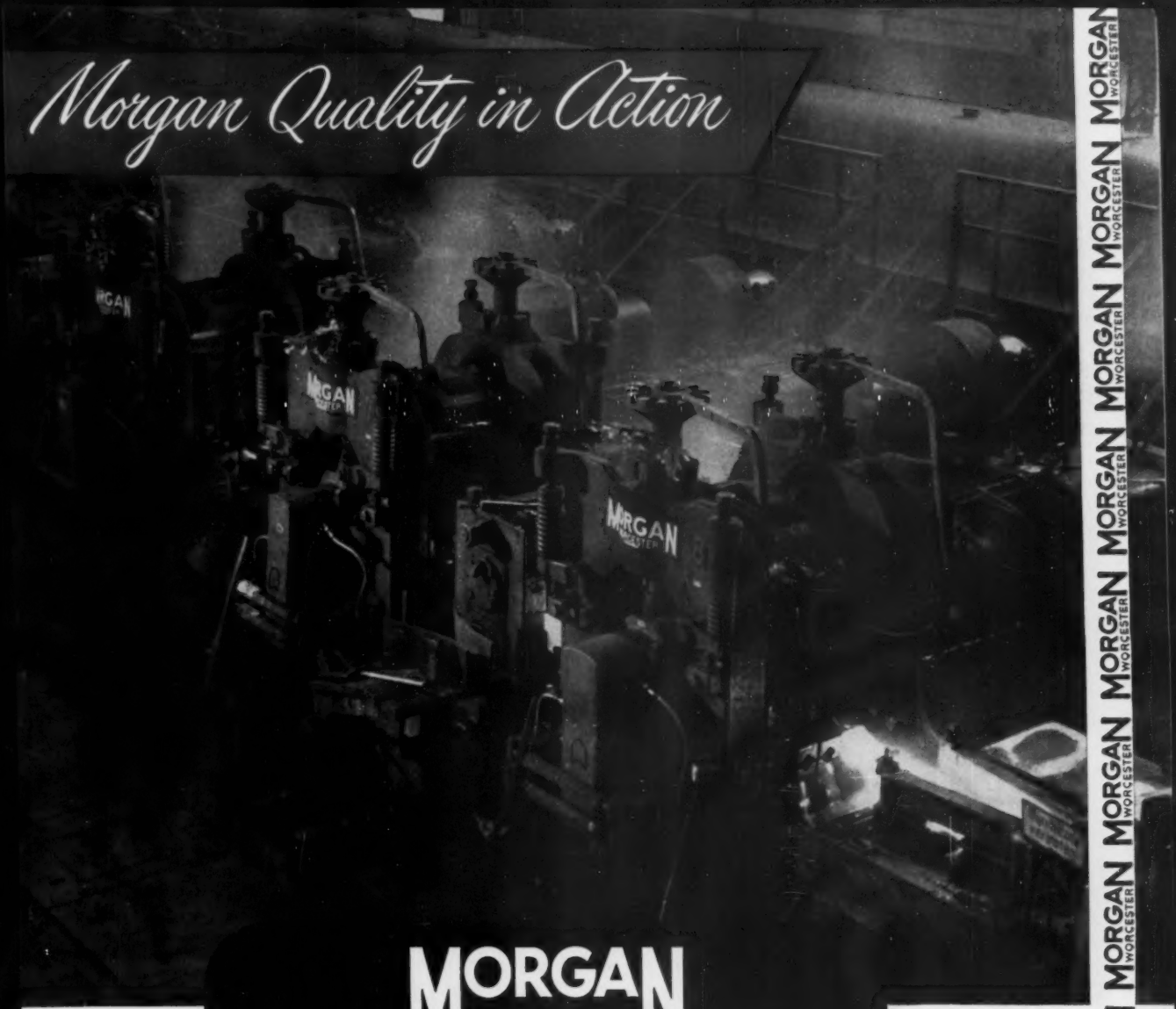


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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

# EDITORIAL

## What Price Executive Training?

◆ Don't be surprised in a few years if you see wives coming into the office for questioning when hubby is in line for a top position. That is the way the wind is blowing if we gage correctly recent talks and propaganda on executive training.

Today there is more "talk" about this than there are "command" appearances. But the number of cases where companies want a close look at the wife is increasing by leaps and bounds. As long as this is kept within reason, fine; but will it be?

In their enthusiasm to have the wife play an important part in her husband's—and the company's—future, some people are going overboard. Some articles carry instructions about drinking, small talk, proper clothes—and even how much to lay it on without appearing insincere.

There is a whole raft of stuff about how the husband has a tough day ahead. He should be sent off carefree, happy and ready for world-beating tasks. This is good advice. Everyone wants to start the day right; and with help if possible.

The better half is told it is a hard job to be an executive. It is difficult. She can help. She is often the key to the situation in many successes and failures. Her attitude often makes or breaks a candidate for high office. No one will deny that.

But are we to believe that all this must be handled as coldbloodedly as setting up an instruction manual for a Univac operator? Should we supply each aspirant for the presidency with a book of Do's and Don'ts for his everloving partner?

Current chatter on the wife's place in the business life of future executives proceeds along the line that she is part and parcel of company policy. Unless this is put in a better light some company policy makers may make things worse instead of better.

Take those who have worked together, raised a family and have gone through hell and high water. It is unlikely that either will need a crass reminder that the wife should look smarter, hold her glass more daintily or pick the right chit chat in order to hoist her mate on the company organization chart.

The other kind wouldn't help anyway.

Tom Campbell

EDITOR-IN-CHIEF

New...

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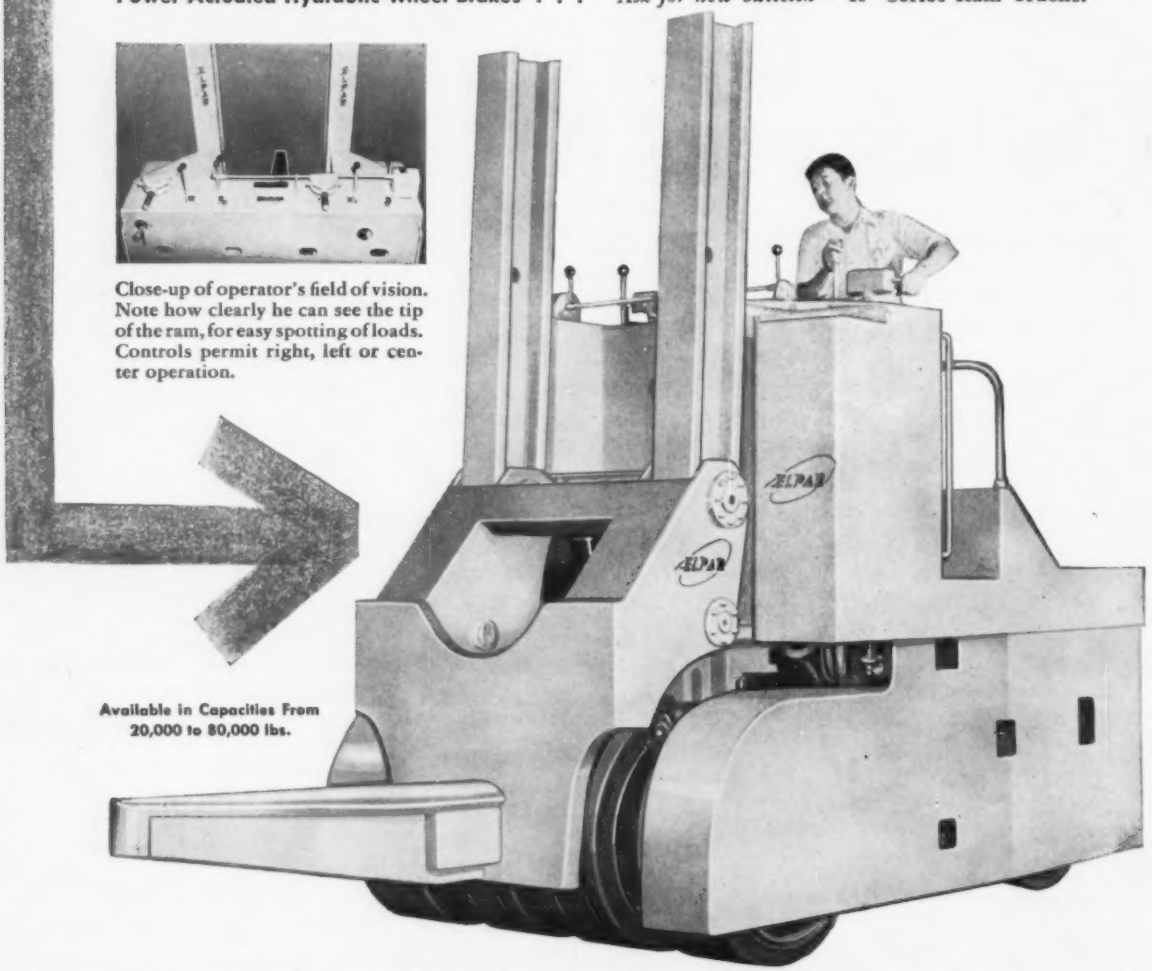
Close-up of operator's field of vision. Note how clearly he can see the tip of the ram, for easy spotting of loads. Controls permit right, left or center operation.

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## dear editor: *letters from readers*

### First Glance

Sir:

Just a note to let you know that we sincerely appreciate the editorials in THE IRON AGE.

It is the first article I read and look forward to it in each edition.

Your comments are intelligent and your views farsighted. *W. Romito, Sales Mgr., Romito-Donnelly Corp., Ravenna, Ohio.*

### Management Talent

Sir:

Your special report, "How to Grow Management Talent" is an excellent concise statement of fundamentals so necessary for us to follow today. May I have three reprints? *P. Z. Kistler, Director of Industrial Relations. New York Wire Cloth Co., York, Pa.*

### IA's Finest

Sir:

Please send three copies of "How to Get More for Your Handling Dollar."

This article is one of the finest I have read on material handling. Keep up the good work. *R. H. Robison, Material Handling Engineer, Talon, Inc., Meadville, Pa.*

### Steel Rule Dies

Sir:

We use steel rule dies in the production of gaskets of cork and of cork and rubber.

In an attempt to keep ourselves abreast of new developments in this field we have been searching for books, periodicals or catalogues. We are interested in instruction books of both primary and advanced information.

I understand you published articles on this subject in your April 19, 1956 issue. *H. F. Suthers, Plant Engineer, Mitchell & Smith Div., Sheller Mfg. Corp., Norfolk, Va.*

See "Design Dies Today, Start Stamping Tomorrow" April 19, p. 99.—Ed.

### Commercial Titanium

Sir:

Please send me three reprints of the article, "Will Titanium Ever Go Commercial" which appeared in the June 7 issue of THE IRON AGE. *J. A. Roemer, President, Mallory-Sharon Titanium Corp., Niles, Ohio.*

Rolling Titanium

Sir:

We would greatly appreciate receiving three copies of the reprint of the article appearing on pages 111 through 116 of the June 7 issue entitled "Will Titanium Ever Go Commercial?" *C. I. Bradford, President & General Manager, Rem-Cru Titanium, Inc., Midland, Pa.*

### Improve Properties

Sir:

We took very much interest in your excellent May 31 article, "Low Carbon, Low Nitrogen Improve Stainless Properties."

We shall very much appreciate receiving two reprints of the above-mentioned article. *P. C. Daub, Marathon Specialty Steels, Inc., New York, N. Y.*

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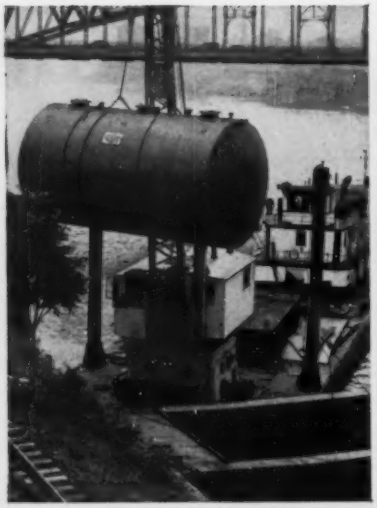

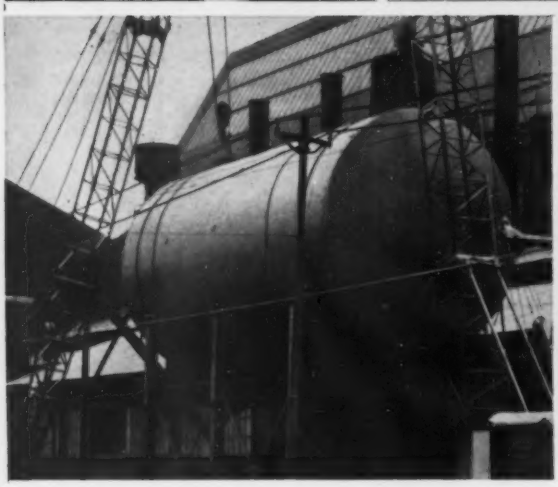

GOODYEAR INDUSTRIAL PRODUCTS

GTM - **Specified** Typical Uses for PLIOWELD

(corrosion-resistant rubber lining or covering)

- Tanks—rectangular, round, square, open top, flat or dished heads
- Tank Covers—flat, box, radius types
- Truck Tanks
- Tank Barges
- Railroad Tank Cars
- Fans—blades, wheels, housings
- Flanged Pipe and Fittings
- Fume Hoods and Ducts
- Scrubbers and Towers
- Air Purifiers
- Agitators
- Troughs and Chutes
- Continuous Vacuum Filters
- Pumps
- Filter Frames
- Miscellaneous Fabricated Items

PLIOWELD can also be used to combat abrasion

# G.T.M. completes another "turn-key" tank lining job

FOR stream pollution abatement, an eastern steel mill needed a number of big tanks to collect and treat waste pickle liquor—four 45,000-gal. storage tanks, three 41,000-gal. storage and leaching tanks, and five smaller tanks.

The G.T.M.—Goodyear Technical Man—recommended lining the tanks with PLIOWELD—especially compounded corrosion- and abrasion-resistant rubber. He also agreed to handle the complete job "from blueprints to saddles." This included procurement of tanks, lining at fabricator's plant, and movement by barge and truck to customer's plant. And this involved hiring movers and equipment, obtaining rights of way, moving telephone and electrical wires, making police and traffic arrangements.

The net result was a "turn-key" job, delivered as ordered, with no problems for the customer. Like to have your lining job handled the same way? Just turn it over to the G.T.M.! Contact him through your Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

**PLIOWELD TANK LININGS by**

**GOODYEAR**

**THE GREATEST NAME IN RUBBER**

Pliowold—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

## fatigue cracks

*by William M. Coffey*

### 3-D

A few weeks ago IRON AGE Art Director J. A. Degen came into the office gingerly carrying the sort of box that suits come in. We care little what kind of clothes our people wear so we couldn't understand why all the fuss about opening the box.

Of course it wasn't a new summer suit; it was the three-dimensional design which you saw on this week's front cover. And which you will also find on p. 89 leading off "How to Beat the Heat."

### Weekend's Work

Mr. Degen (He's a very good art director so we often call him "Mr.") explained that he had spent the better part of a weekend cutting the thing out of dozens of pieces of yellow paper. The finished fan was about the size of a suit box and just about as deep. Hence the 3-D effect produced by photographing the device with side lighting.

Sound easy? Not unless you have a 3-D mind, a sound knowledge of design and AAA scissor dexterity. Fact is we rejected a similar design done for us by a New York studio.

### Keep it Clean

Couple of years ago the editors came up with a brainstorm in the form of a "Metal Cleaning and Finishing Handbook," a 32-page section in your f.f.j. which they thought would have "rather wide" interest. But as is usually the case, they erred on the conservative side. They knew of course that THE IRON AGE is read in more than 10,000 plants that have metal cleaning and/or finishing departments. But no one expected the flood of reprint requests that hit us when that issue came out.

Since then some 10,000 reprints have been requested. But processes change in 2 years. And so, next week you'll get the latest edition, completely revised—with some additions, some deletions. It will cover such things as: Shot blasting, pickling, degreasing, brushing. finishing aluminum, magnesium, steel, etc. There are 6 pages of the current Government Specifications on conditioning, coatings, rust preventives. And there's a special 8-page article on the latest in plating on zinc, brass, copper, nickel, chromium—plus new developments in alloy plating.

### Puzzlers

Who's right? (May 17 Banker's Special puzzle) Ole Darcey says "appears to yield a simple interest rate of 2.348% or a rate compounded annually of about 1%." A. C. Willis, Temco Aircraft Corp., says 4½% and J. S. Hiles, Lukens Steel Co. is in agreement with 4.87%. The temperature in Philadelphia at this minute is 95°. You'll have to wait for our solution until it drops at least to a pleasantly cool 90°. In the meantime we'll take the easy way out and go along with the majority at 4½%.

### New Puzzler

A snail climbs a pole. On the 1st day he climbs 1/2 the length of the pole. On the 2nd day he climbs 1/3 of the remainder. He climbed 1/4th, 1/5th, 1/6th and 1/7th of the remaining distance on the 3rd, 4th, 5th, and 6th days respectively. On the 7th day he climbed 1′ 4″ and reached the top. How long is the pole? Many thanks to Mr. Ertner for this one.


3 important reasons you should use STAR "Moly"® High Speed Steel Blades

1 They outlast standard steel blades 10 to 1!

2 They assure high speed cutting performance second to none.

3 They are substantially lower in cost than any other type high speed steel blades!

Star was the first to successfully use molybdenum to make "Moly"® High Speed Steel Blades that would be tough, carry the load, retain sharpness and embody all the other high qualities and properties of heavy-duty blades. Order "Moly" High Speed Steel Blades from your Industrial Distributor. Rely on him for *all* your metal-cutting needs. Remember, he carries the complete line of STAR Hand and Power Hacksaws, Metal and Wood Cutting Band Saws and Hacksaw Frames.

FREE ®1000

Ask your Industrial Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts.

*Sold Only Through Recognized Distributors*

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MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Mowers.

# One set-up saves 30%

*Photos courtesy of the Kelman Electric & Mfg. Company, Los Angeles, California.*

Boring, facing, and high speed drilling with one set-up cut the floor to floor time about one-third on this job.

The Kelman Electric & Mfg. Company say their Cincinnati Super Service Radial Drill "handles easily, is very accurate and versatile."

They are facing 6" diameters; drilling for ½" bottom tap, and tapping with a ½" bottom tap on this job.

The part being processed is a Bronze Top Casting.

Cincinnati Super Service Radial Drills are profit makers in this shop, and they could be in yours.

*Write for Bulletin R-21C*

**CINCINNATI BICKFORD**

SUPER C·B SERVICE

**RADIAL AND UPRIGHT DRILLING MACHINES**

**CINCINNATI BICKFORD DIVISION**

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

## dates to remember

**JUNE**

MATERIAL HANDLING INSTITUTE—3rd annual material handling training conference, June 17-30, Lake Placid, N. Y. Society headquarters, 813 Clark Bldg., Pittsburgh.

AMERICAN SOCIETY FOR TESTING MATERIALS — 61st annual meeting, June 22-28, Hotel Statler, Boston. Society headquarters, 1916 Race St., Philadelphia.

ALLOY CASTING INSTITUTE—Annual meeting, June 24-26, The Homestead, Hot Springs, Va. Society headquarters, 32 Third Ave., Mineola, N. Y.

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EXPOSITIONS

WESTERN PACKAGING AND MATERIALS HANDLING EXPOSITION, July 10-12, Los Angeles.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

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DROP FORGING ASSN.—Annual meeting, June 24-27, The Homestead, Hot Springs, Va. Society headquarters, 605 Hanna Bldg., Cleveland.

NATIONAL ASSN. OF COST ACCOUNTANTS—37th international cost conference, June 24-27, Conrad Hilton Hotel, Chicago. Society headquarters, 505 Park Ave., New York.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer and Pacific general meeting, June 25-29, Fairmont Hotel, San Francisco. Society headquarters, 36 W. 46th St., N. Y.

**JULY**

CUTTING TOOL MANUFACTURERS ASSN.—Quarterly meeting, July 25, Lochmoor Country Club, Detroit. Society headquarters, 416 Penobscot Bldg., Detroit.

**AUGUST**

NATIONAL SCREW MACHINE PRODUCTS ASSN. — Annual national sales conference, Aug. 7-8, Wade Park Manor Hotel, Cleveland. Society headquarters, NSMPA Bldg., Cleveland.


# FIRE!

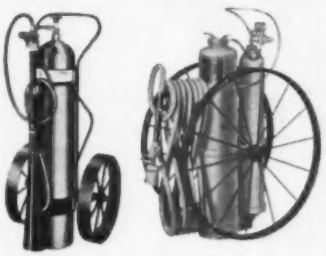
## HOW TO DETECT AND EXTINGUISH IT IN SECONDS!

### HAND PORTABLES

Carbon Dioxide | Foam Soda-Acid Clear Water Anti-Freeze | Pressurized Water Anti-Freeze | Dry Chemical

Kidde $CO_2$ Portables, either trigger-release type or squeeze-type valve models, are available in sizes from 2½ to 20-pound capacities. New Kidde Wet Chemical extinguishers are available in 2½ gallon bronze or stainless steel models, including pressurized Water or Water-Anti-Freeze Unit (illustrated). Kidde Dry Chemical Extinguishers are available in cartridge-operated models of 20 and 30 pounds capacity or pressurized models of 5 and 10 pounds capacity.

### MOBILE EQUIPMENT

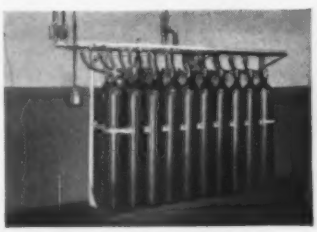


50, 75 and 100 lb. $CO_2$ Units | 150 lb. Dry Chemical Unit

For major fire hazards, get a mobile unit. Wheeled $CO_2$ units are available in 50, 75 and 100 pound capacities, in one cylinder.

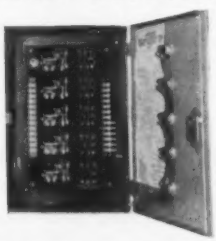
150 pound dry-chemical unit has straight stream for long range . . . fan pattern for wide coverage. Both units give expert results even with inexperienced operator.

### $CO_2$ SYSTEMS



New Kidde pressure-operated $CO_2$ extinguishing systems are individually designed to fully protect even the most dangerous hazards, use no falling weights or clumsy mechanical triggering methods. Pneumatic Control Heads insure instant and complete $CO_2$ discharge. Directional Valves afford protection to more than one hazard using the same bank of $CO_2$ cylinders.

### ATMO DETECTING SYSTEMS



Kidde ATMO is a wide-area automatic fire detecting and warning system which works on the principle of rate-of-temperature-rise. It is ideally suited for cases where life protection is of vital importance, or where quick, early detection of fire in valuable materials is essential.

The very first hot breath of fire triggers the ATMO system, and sounds the alarm. In addition, the system can also close doors, shut off fans or blowers – all *automatically*.

What's more, the Kidde ATMO system operates independently of regular power sources, will still give protection even if outside power fails.

**Kidde** (K Kidde)

**Walter Kidde & Company, Inc.**
**649 Main Street, Belleville 9, N. J.**
Walter Kidde & Company of Canada, Ltd.
Montreal—Toronto

# do you want low-cost corrosion or contamination

Acetone • Latex • Calcium Carbide • Calcium Carbonate • Calcium Chloride (Flake) •
Ethyl Acetate • Ethyl Alcohol • Ethylene Glycol • Glycerine • Insecticide Concentrates •
Soap and Soap Lye • Soda Ash • Sodium Bicarbonate • Sodium Silicate •

# CF&I LECTRO-CLAD* Nickel Plated Steel Plates will give it to you

Yes, you can get low-cost, yet effective protection against contamination and corrosion with all these chemicals...and many more!

Effective in heavy industrial applications where the corrosion rate does not exceed 0.0015 inches per year, CF&I LECTRO-CLAD Nickel Plated Steel Plates successfully combine the corrosion and contamination resistance of nickel and the economy and strength of carbon steel.

That's because CF&I LECTRO-CLAD is made by the Bart Process, which consists of electrodepositing a heavy layer of 99% pure nickel on a carbon steel plate. This process results in a permanent bond between the nickel and the steel base. The nickel plating is customarily supplied in the 8-10 mil range; however, it can be plated up to 15-20 mils, if specified.

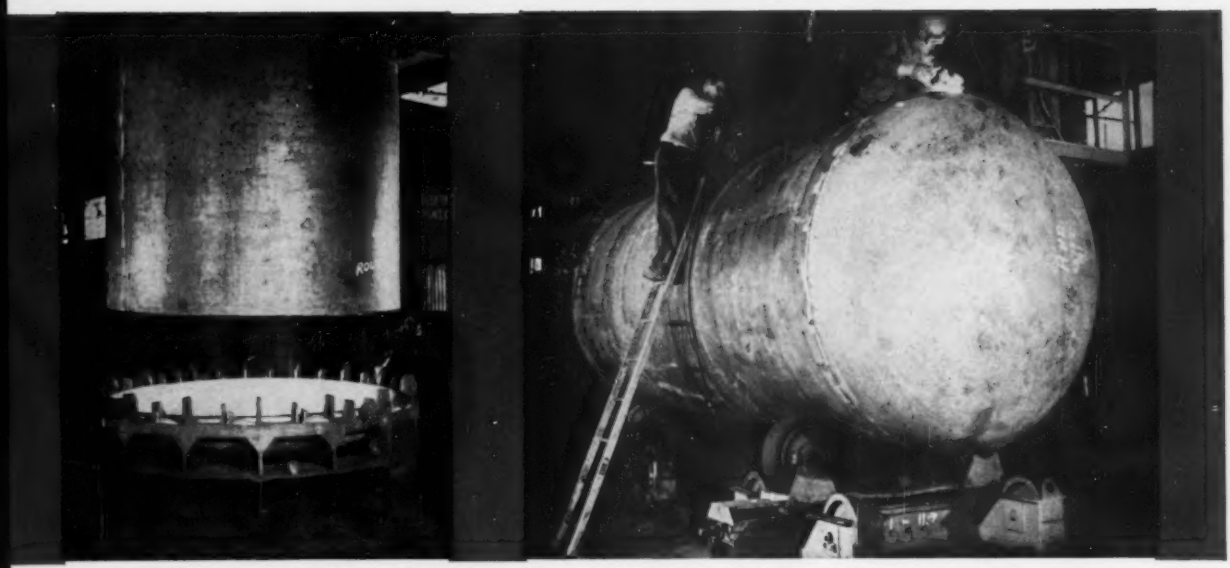
What's more, CF&I LECTRO-CLAD Nickel Plated Steel Plates are easily fabricated without costly special equipment. Just use regular shop equipment and bend it...weld it... roll it—the protective nickel layer will not check, spall or flake!

Ask our nearest sales office for the complete story on economical, effective, easy-to-fabricate CF&I LECTRO-CLAD Nickel Plated Steel Plate today. Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

*Electroplated by the Bart Process

# protection against with these chemicals?

Caustic Soda • Chlorinated Hydrocarbons • Cold Hydrochloric Acid • Dibutyl Phthalate
Methyl Alcohol • Petroleum Catalysts • Phenol • Potash • Resin Plasticizers • Salt
Sodium Sulphate • Titanium Dioxide • Tricresyl Phosphate



Assembling a tank fabricated from CF&I LECTRO-CLAD Nickel Plated Steel Plates.

3798

## *Claymont Steel Products*

CF&I

*Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporatio.*

Abilene (Tex.) • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
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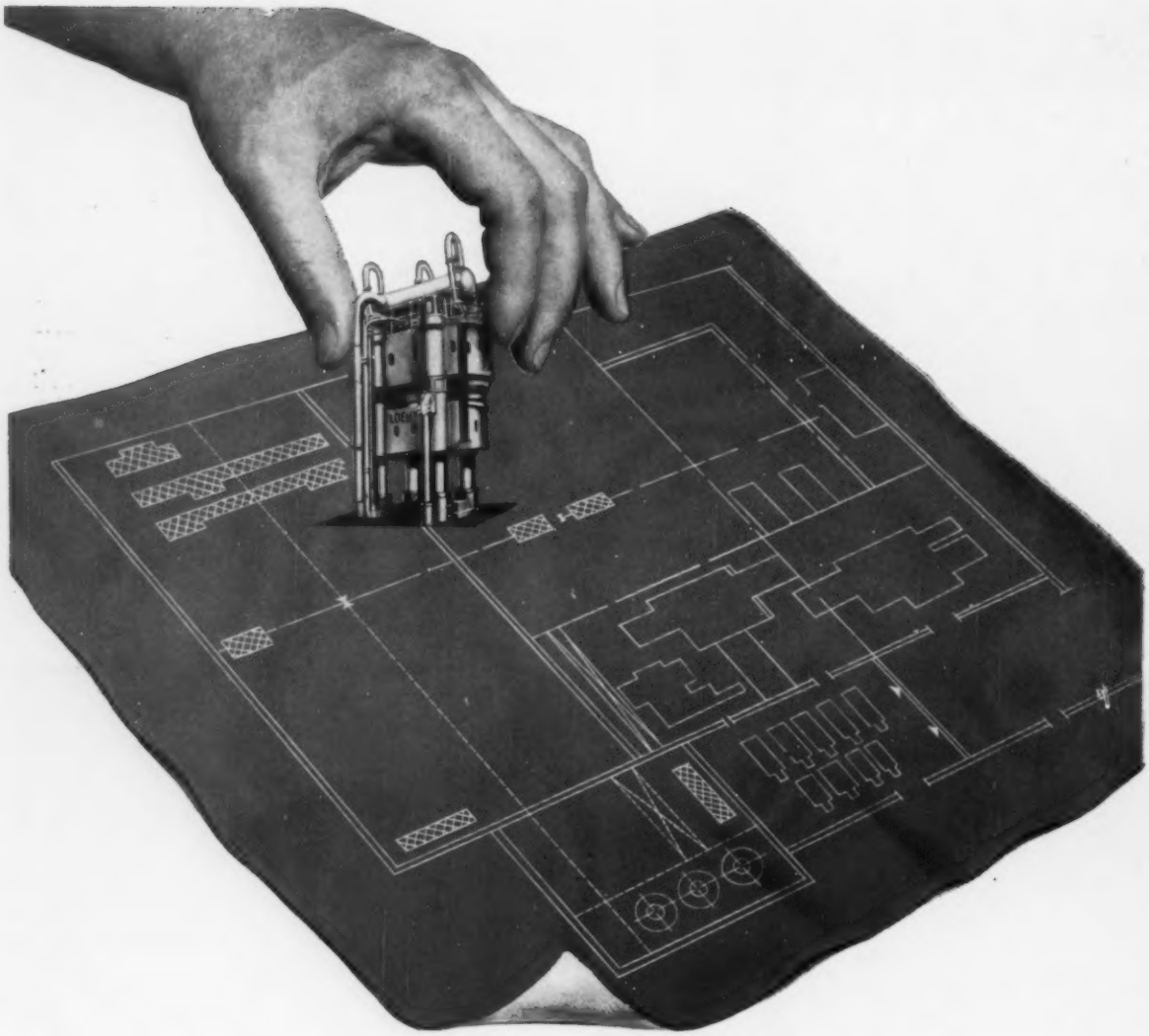
**OTHER CLAYMONT PRODUCTS**

**Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe**
**Flame Cut Steel Plate Shapes • Flanged and Dished Heads • Carbon and Alloy Steel Plates**



# how Loewy-Hydropress engineers can help you ... from plans to full scale production

Our staff of 400 engineers is at your service for any project, large or small. Here's what we offer:

- Research and development, including analysis of materials, methods, machinery operations, surveys and analytical reports.
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Whether you require only preliminary consulation on an idea, or a complete "turn-key" job, you can depend on Loewy-Hydropress. For a copy of our bulletin L-144, write to Department 116, 350 Fifth Avenue, New York 1, N. Y.

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# Nothing finer!

A statement from
a conservative organization:

*"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."*

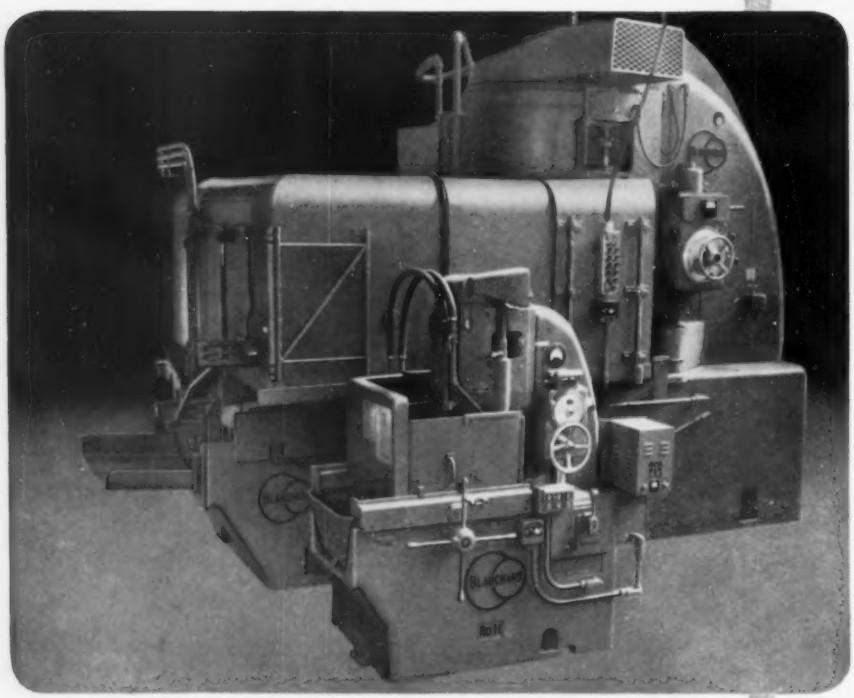
You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

S.S. United States... most modern, fastest liner afloat.

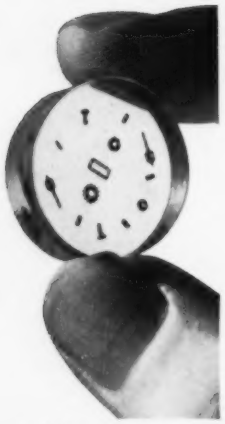
**ROEBLING** (CF)

*Subsidiary of The Colorado Fuel and Iron Corporation*

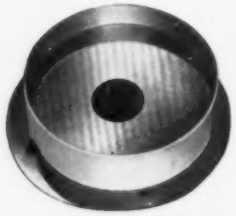
ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK



V-488



Tiny watch gears, pinions and ruby bearings — flat and parallel — to a dimension tolerance of .0002".



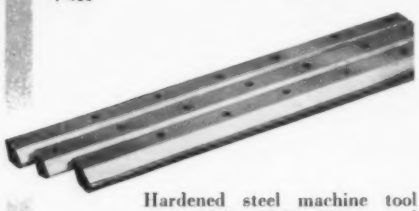
To 3 micro-inches and flat within *one* light band.

# *Please* give us a chance!

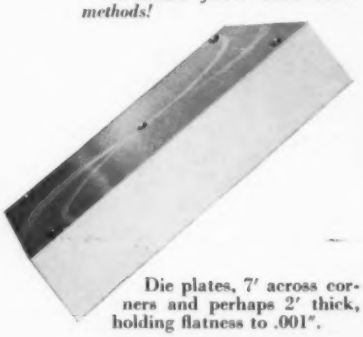
We *know* we can do *your* flat surface jobs. We've done them all — tiny watch parts . . . steel plates 7 feet across corners . . . copper and ceramics . . . *perfectly*. Just give us the correct wheel . . . (Blanchard wheels are preferable).

Blanchards regularly grind surfaces flat to within 2 to 4 light bands, parallel to less than .0001", with dimension tolerance of .0002" and surface finish to better than 3 micro-inches.

Honest, we Blanchards (15 models) work fast and inexpensively — whether the job requires precision grinding or rapid removal of stock. Give us a chance to prove we're the best investment you ever made.



Hardened steel machine tool ways, 2½" x 3½" x 50", ground on 6 sides, flat within .001" with surface finish of 5 micro-inches — *5 times faster than other methods!*



Die plates, 7' across corners and perhaps 2' thick, holding flatness to .001".

Send for free copies of "Work Done on the Blanchard" (fourth edition), and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

**ANOTHER SCIAKY FIRST . . .**

# PRECISION CONTROL

## for Resistance Welding as accurate as the time signals of the U. S. Naval Observatory

**Now, Satisfy Your Most Rigid Production Standards on Long or Short Runs**

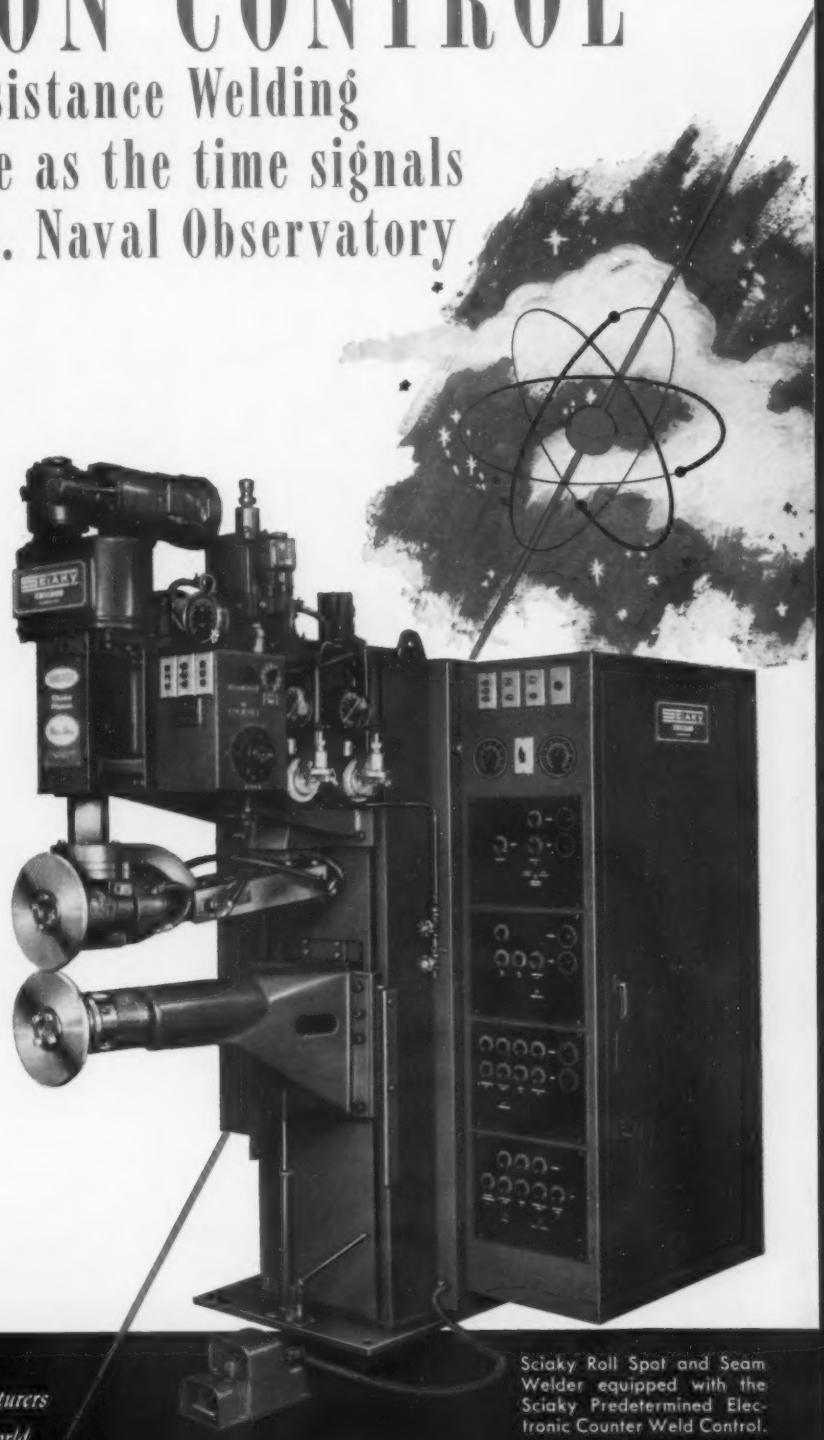
The Sciaky Predetermined Electronic Counter Weld Control employs a Dekatron tube to count the cycles of power line frequency and impulses of secondary current in predetermined absolute numbers and without deviation. Since power line frequency is maintained by reference to Naval Observatory time signals, you get these same standards of accuracy with the new Sciaky Control. Welder functions are *CENTRALIZED* — only one Dekatron tube is used to control succeeding functions such as "squeeze, weld, hold, and off".

The Sciaky Predetermined Electronic Counter Weld Control is absolutely consistent. Positive adjustment snap switch control dials are calibrated in cycles and impulses. You set the number of cycles and impulses you want and you get them throughout the longest or shortest run—and you can easily reproduce them at any time.

Unitized, plug-in sub-assembly units are used to simplify maintenance and make it possible to add welder functions easily. In either case, down time is limited to the few minutes it takes to plug in a spare assembly or the additional units desired.

To find out more about this revolutionary new control ask to see your Sciaky Sales Engineer or write for Bulletins No. 338 and No. 339. There's no obligation.

**SCIAKY BROS., INC.,**
**4923 W. 67th St., Chicago 38, Ill.**
**POrtsmouth 7-5600**



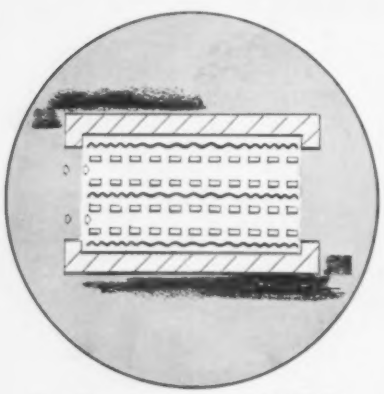
Sciaky Roll Spot and Seam Welder equipped with the Sciaky Predetermined Electronic Counter Weld Control.

*Largest Manufacturers of Resistance Welding Machines in the World*

SCIAKY®

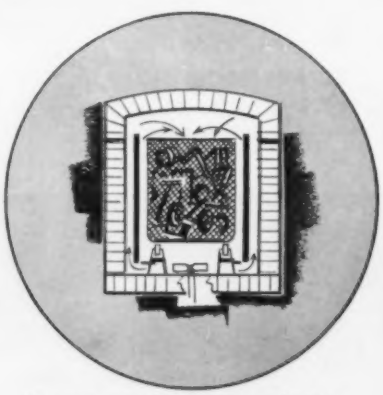
# BRAND NEW—MODERN ELECTRIC ELEMENT

This shows graphically how the new Lindberg CORRTHERM electric heating element actually fills the furnace with walls of glowing heat. Note also that CORRTHERM is conveniently hung from simple brackets requiring no complicated connections or construction. This element operates at extremely low voltage, eliminating shock or short hazards.



In continuous type furnaces CORRTHERM elements hang between lines of work as well as on side walls. Note how closer corrugations (at each end of element) compensate for incoming cold work and door losses.

CORRTHERM elements act as natural baffles to direct forced convection streams through the charge. The use of electric furnaces for carburizing and carbonitriding now becomes completely practical.



No retort needed in pit-type carburizing furnace with CORRTHERM elements. Again see how elements serve as baffles to direct forced convection stream through charge.

# FOR LINDBERG FURNACES

Never before has there been an electric heating element like this CORRTHERM by Lindberg. Its revolutionary advantages now make the use of electricity as the source of heat, practical, efficient and economical for all heat treating processes.

Ideal for use in any electric heat treating furnace, CORRTHERM elements have particular advantages for carburizing and carbonitriding. This new element completely eliminates problems formerly created by the use of electricity in these types of furnaces. These exclusive advantages of CORRTHERM explain how and why:

**LOW VOLTAGE:** Operates at extremely low voltage. No leakage through carbon saturation. Around Lindberg we talk about it as the electric element "without any electricity . . . to speak of!"

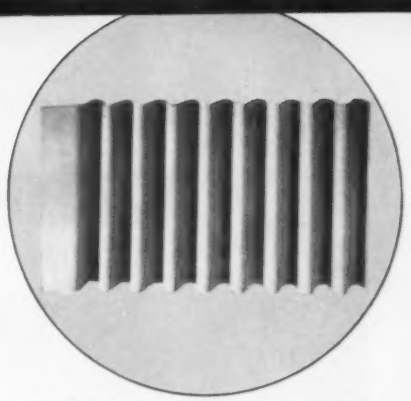
**ATMOSPHERE CIRCULATION:** Elements act as baffles to direct circulation of convection streams.

**SAFETY:** Extremely low voltage also eliminates shock or short hazards.

**DURABILITY:** Watts density at all-time low. Element practically indestructible. Work load or operator's charging tool can't hurt it.

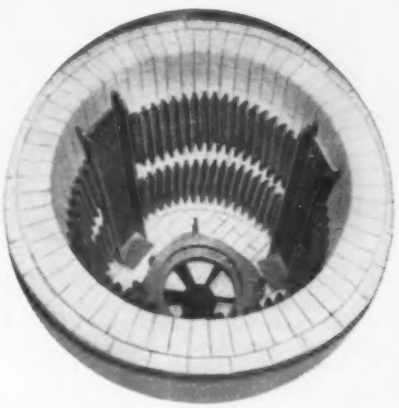
**EASILY INSTALLED:** Element is not enclosed, just hangs in furnace. No complicated mountings required.

If electricity is the preferable source of heat for your metal treating processes find out how advantageously CORRTHERM elements can be applied to your requirements. Just get in touch with your nearest Lindberg Field Representative. (Consult your classified phone book.)



CORRTHERM elements are large sheets of corrugated nickel chromium. They were developed in Lindberg laboratories by Lindberg metallurgists and engineers.

This shows installation of CORRTHERM elements in one of two large rotary furnaces currently being erected in the field by Lindberg's associate company, Lindberg Industrial Corporation.



An installation of CORRTHERM elements in a carburizing pit-type furnace. Simplicity of mounting makes replacement easy and economical.

# LINDBERG


**LINDBERG ENGINEERING COMPANY**

**2452 West Hubbard Street, Chicago 12, Illinois**

**Los Angeles Plant:** 11937 South Regentview Avenue, at Downey, California

**Associate Companies:** Lindberg Industrial Corporation, Chicago • EFCO-Lindberg, Ltd., Montreal, Canada
Lindberg Italiana, Milan, Italy • The Electric Furnace Company, Ltd., Weybridge, Surrey, England
Etablissements Jean Aubé, Paris, France • Lindberg Industrie Ofenbau, Gross Auheim, Germany

Safety! Extremely low voltage makes CORRTHERM elements completely safe. Let operator or work load bang it if they will. Neither element nor operator will be hurt.

# CORRTHERM

## by LINDBERG

At Scully-Jones and Co., Chicago:

# MACHINING COSTS GREATLY REDUCED

Here's how the Carboloy Machinability Computer showed Scully-Jones and Co., Chicago, how to reduce machining time 46% on a single job. Original operating standard for machining expanding shells called for 244 minutes per part. But by calculating the optimum combination of speeds, feeds, and other data on the Computer, the company saved 48.8 minutes per part. The Computer was used to determine setups for both HSS and carbide tools . . . on turning, facing, drilling, and boring operations.

**Partial list of plants now using the Carboloy Machinability Computer:**

Allied Products Corp.
Armstrong Cork Company
Beech Aircraft Corp.
Bendix Aviation Corporation
Utica Division
Bethlehem Steel Company, Inc.
Boeing Airplane Company
Bryant Chucking Grinder Co.
Burroughs Corporation
Caterpillar Tractor Company
Chrysler Corp.
Airtemp Division
The Cincinnati Shaper Co.
Cone Automatic Machine Co., Inc.
DeLaval Steam Turbine Co.
The DoALL Co.
Fuller Company
General Electric Company
Gisholt Machine Company
Goulds Pumps Inc.
Greenfield Tap and Die Corporation
Geometric Tool Company Division
Greenlee Bros. & Co.
Houdaille Industries, Inc.
Buffalo Hydraulics Division
Joy Manufacturing Company
Claremont Division
Ladish Co.
The Maytag Company
Mergenthaler Linotype Company
Miehle Printing Press & Mfg. Co.
Mueller Brass Co.
The National Acme Company
The New Britain Machine Co.
New Britain-Gridley Machine Division
Pachmayr Corp.
Porter-Cable Machine Company
Reed Roller Bit Co.
Cleco Air Tools Division
The R. K. LeBlond Machine Tool Co.
Rockwell Spring & Axle Co.
Blood Brothers Machine Division
Ryan Aeronautical Company
S. Morgan Smith Co.
Standard Pressed Steel Co.
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A Division of Sundstrand Machine Tool Co.
Thompson Products, Inc.
Wagner Electric Corporation
Westfield Metal Products Co., Inc.
The Yale & Towne Manufacturing Co.
Yale Materials Handling Division

# WITH CARBOLOY MACHINABILITY COMPUTER

- **Determined most efficient cutting conditions**
- **Set up new operating standards in seconds**
- **Eliminated wasteful tryout runs, saved stock**
- **Saved 17 hours' machining time on a single job**
- **Provided closer control over machine downtime**

Obtaining maximum production from their machines is now an easier matter for Scully-Jones and Co., Chicago. Machining data are fed into their Carboloy® Machinability Computer . . . and in seconds, optimum speeds, feeds, horsepower ratings, or any of 16 other operating variables are figured for the operator.

On the job at left, for example, the Computer showed how to cut machining time 46% on a 13-piece run . . . saving 17 machining hours, and eliminating wasteful, time-consuming tryout runs.

### Benefits extend plant-wide

On other jobs throughout the plant, the Computer established new operating standards, corrected and verified existing ones. When necessary to improve tool life or production rate, the Computer determined new operating conditions in a fraction of the time previously required.

The advantages of the Carboloy Machinability Computer extend far beyond figuring job setups. The Computer simplified inventory problems by predicting the rate of tool wear. It aided grinding rooms in planning work loads, and helped the plant superintendent coordinate production schedules.

The Carboloy Machinability Computer can be used by anyone with machining experience, after a short familiarization period. And, it can be a powerful educational tool by teaching operators how to improve production or reduce downtime through proper variations in operating conditions.

### Ask for demonstration

The Machinability Computer is battery-operated, portable, and rugged. It is priced at $495 (f.o.b. factory, Detroit).

For more information on how the Computer can help your plant increase production and reduce manpower costs, mail the coupon below. If you wish, we will gladly arrange a demonstration in your plant.

**CARBOLOY**
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11153 E. 8 Mile Ave., Detroit 32, Michigan

☐ Please send more information on the Carboloy Machinability Computer.

☐ Have a representative make an appointment to demonstrate the Computer.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

# "The right quench oil for our work is

# SHELL VOLUTA OIL 23"

says Garland Wilcox, Chief Metallurgist
Wallace Barnes Co., Bristol, Conn.

## ...the story of a profitable change

WALLACE BARNES COMPANY and steel springs have "gone together" for nearly a century. Most of today's output is in SAE 1075 or 1095 steel.

Because the quenching operation is so important to the life of springs, the Wallace Barnes laboratory decided to test its regular quenching oil against some of the newer products, including Shell Voluta Oil 23. This is what they found:

Shell Voluta Oil 23 showed a superior quench rate, with correct hardening and relative freedom from distortion. It drained more rapidly from the quenched parts, reducing dragout loss. It washed off more completely in the alkaline cleaner; it reduced flaming, and cut down on the oil baked to parts.

Wallace Barnes reports that this oil has almost eliminated trouble with "slack-quenched parts," and that heavier stock now goes through without special handling. So . . . Shell Voluta Oil 23 has replaced the former quench oil in all tanks of the spring hardening departments, serving salt pot lines and shaker hearth furnaces.

We'll be glad to provide full information on Shell Voluta Oil 23.

WALLACE BARNES CO.
A division of Associated Spring Corp.
Bristol, Conn.

Photos courtesy "STEEL"

Shaker hearth furnaces automatically dump parts into Shell Voluta Oil 23, then remove and drain them.

Flat springs at austenitizing temperature get a fast quench in Shell Voluta Oil 23.

Over 35,000 prints of production items like these are kept on file at Wallace Barnes Co.

**SHELL OIL COMPANY**

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

FIVE-STAND TANDEM MILL at U.S. Steel's Irvin Works incorporating an automatic gage control system

# At U.S. Steel: NEW G-E Automatic Gage Control Improves Steel Strip Quality

An automatic gage control system for closer, continuous control of cold reduction mills producing sheet and strip products, has been developed through the co-operative efforts of the United States Steel Corporation and the General Electric Company. The system, now in use at U.S. Steel's Irvin Works, Dravosburg, Pa., improves the thickness uniformity of cold-rolled steel strip produced at a rate up to 4000 fpm.

**The increasing application** of high-speed continuous sheet and strip mills in the steel industry emphasized the need for automatic control of thickness. To solve the problem, a joint research and development study of cold reduction mill controls was instituted by United States Steel and General Electric.

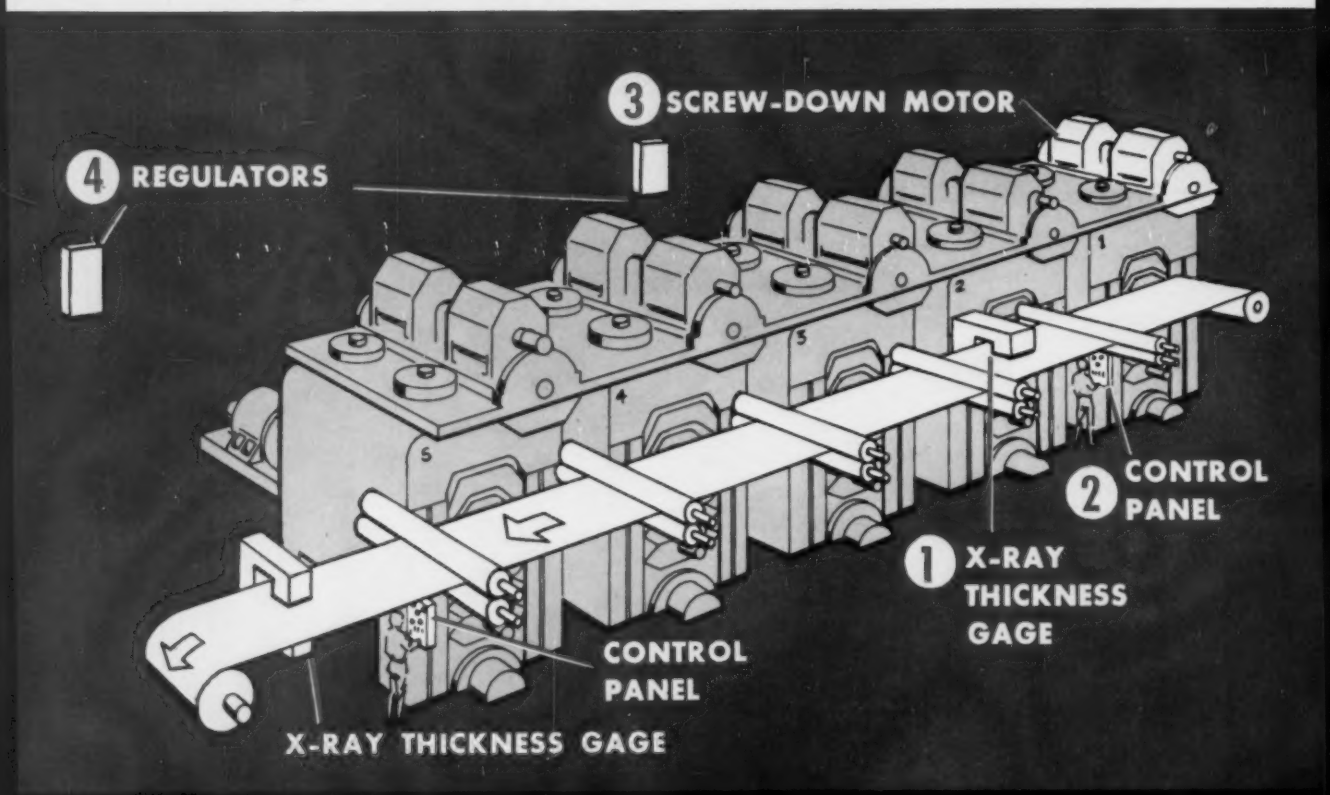
Before attempting to design any system, G-E application engineers set up the problem on an "electronic brain" for study of the complete mill thickness problem and drive system. The analysis took into account all electrical constants, changes in roll pressure and interstand tension. Components of the resulting system design were constructed by G.E.'s Industry Control and X-Ray Departments.

**This new installation** is the first over-all thickness control in the steel industry to utilize not only a screw-down control to vary stand 1 reduction, but also a vernier system operating on the roll speed of the last stand. With this arrangement, thickness variations in the finished product can be held smaller than was ever possible by manual means.

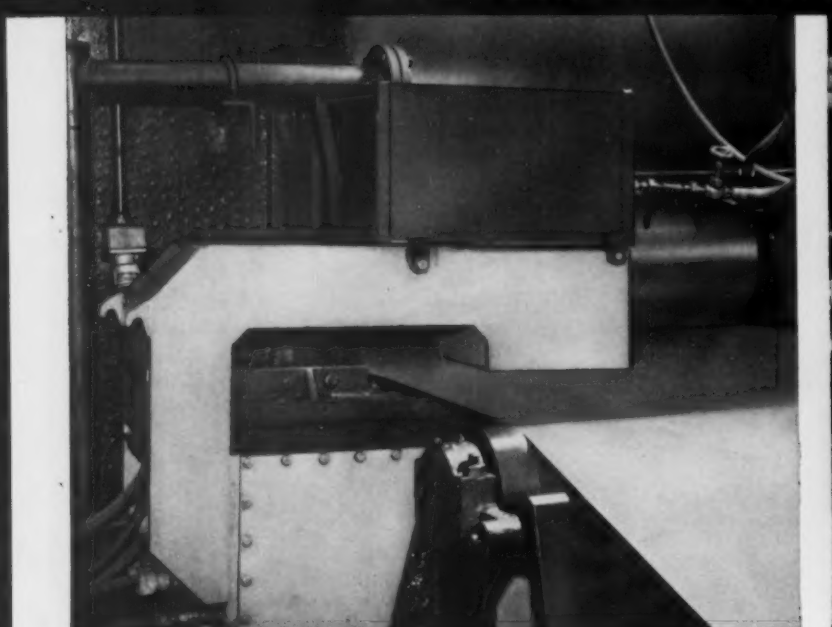
*TURN PAGE FOR SYSTEM STORY* ▶

GENERAL ELECTRIC

# G-E system automatically controls steel




## SYSTEM-DESIGNED COMPONENTS



**1** **G-E 50-KV X-RAY THICKNESS GAGE** is shown partly retracted from gaging position. Each gage is mounted on a truck which retracts gage for servicing and maintenance.

**2** **THE TWO OPERATORS'** control cabinets contain the controls and instruments to set up and observe drive system functions.

# strip thickness, permits closer tolerances

**The x-ray gage system** actually operates as a "watch dog" during the rolling of the strip and is integrated into the rolling process as shown in the illustration at left.

**Here's how it works:** Control of stand 1 originates in an x-ray gage between stands 1 and 2. The strip passes between the x-ray unit and a detector unit. The desired thickness of the steel sheet is set on a dial of the gage. The actual thickness of the steel is then measured by the x-ray gage, and deviations from the desired thickness are brought to the automatic control panel in the form of an electrical signal.

**This signal activates** a transistor discriminator in the automatic control which determines the direction of the error, whether heavy or light, and also the degree of the error. The discriminator emits a signal which is fed into on-and-off time circuits. The resulting signals then operate the up and down relays of the stand 1 screw-down motors, which run in the required direction to correct the steel thickness.

**A 50-kv x-ray thickness gage** similar to the one used between stands 1 and 2 measures and initiates control of the thickness of the strip leaving stand 5 before it is wound on the reel.

**On this mill** the stand 5 direct current mill motor receives its power from a common source which also supplies power to the other mill stand motors. Stand 5 speed can be varied automatically in relation to previous stand motor speeds, thus adjusting the thickness of the material leaving stand 5 through variation of tension between stands 4 and 5.

**In actual operation,** mill is set up manually by operators. Coarse and vernier settings of the motor-field current regulator of the gage system are then set to approximate desired output thickness. During rolling the regulating systems are continuously in control of product thickness and make corrections for all deviations.

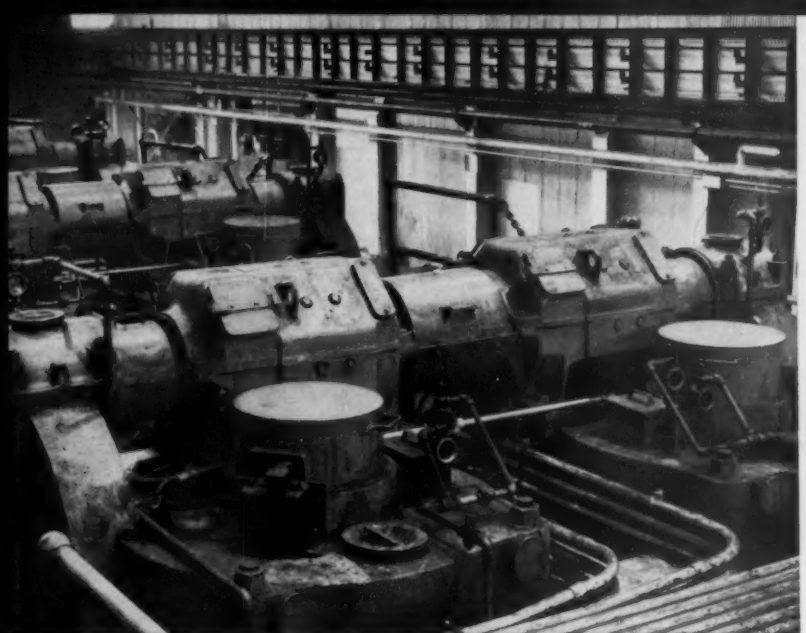
**This new automatic gage control** system was designed to provide a better product, minimize waste due to off-gage material, augment skill, experience and knowledge of the head roller and relieve crew members of adjusting manual controls.

**If you are planning to build,** modernize, or expand your facilities, the same G-E "know-how" which went into this system is available to you. For further information contact your local G-E Apparatus Sales Representative. General Electric Co., Schenectady 5, New York. 659-112

**Engineered Electrical Systems for Steel Mills**

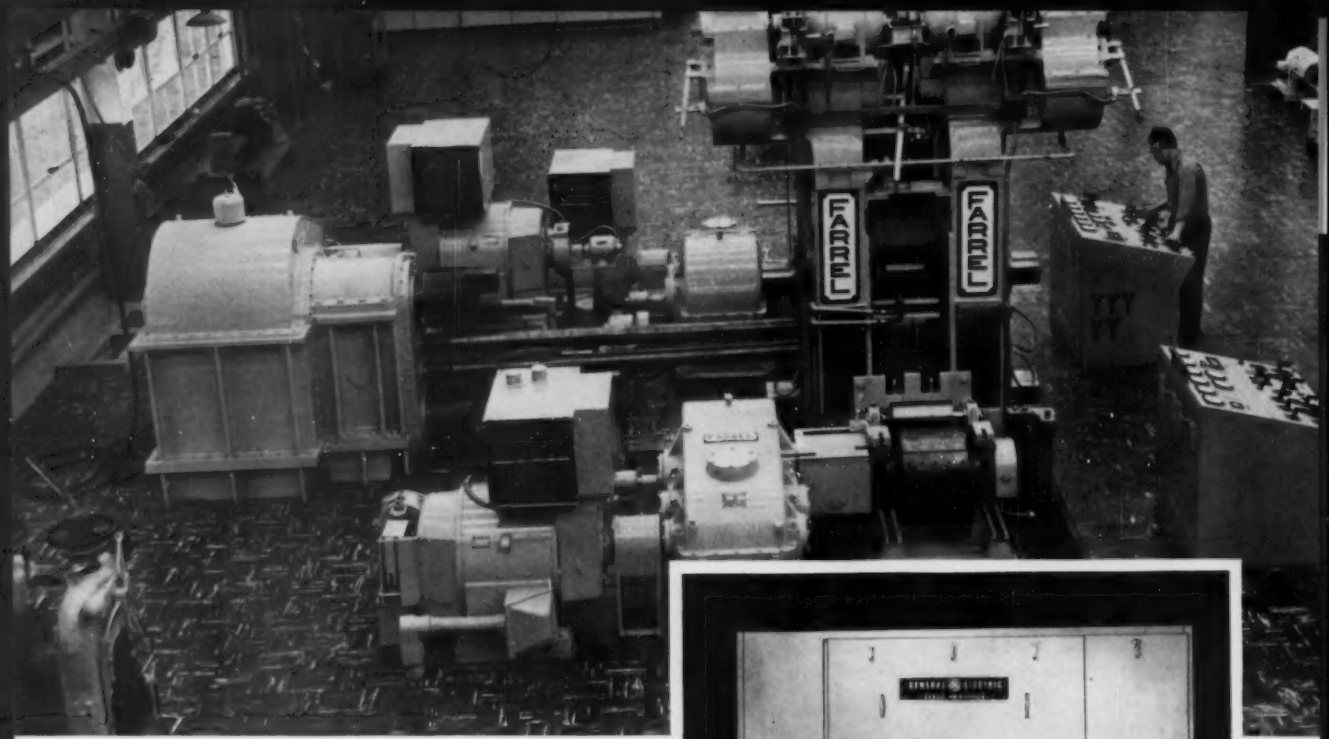
**GENERAL ELECTRIC**

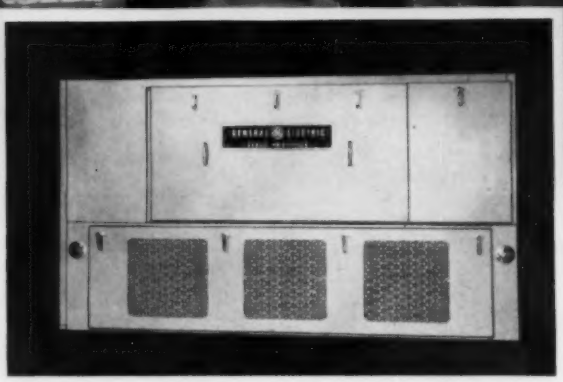
## INTEGRATE ROLLING PROCESS



**3 THE SCREW-DOWN MOTORS** on stand 1 operate as an integral part of the automatic gage control. A screw-reset function automatically returns the screws to their initial position after the coil tail-end leaves the mill.

**4 THE REGULATING SYSTEM** was designed on the basis of transistor and magnetic-amplifier techniques and components.



**Controlled d-c power** for this development laboratory reversing cold strip mill is supplied entirely from G-E Speed Variators. The main m-g set and controls are housed in compact steel cabinets (right), requiring no foundation. These packaged units are engineered to meet your special requirements.

*NOW AVAILABLE FROM GENERAL ELECTRIC*

# Packaged Speed Variators Built to Large Rolling Mill Standards

## COMPLETE ENGINEERING APPLICATION SERVICE TO MEET YOUR SPECIAL REQUIREMENTS

**Built to large rolling mill standards,** General Electric Speed Variators are now available for special drive applications up to 500 hp. Using circuits originally developed for large rolling mills they offer close, accurate control with great reliability and high overload capacity.

**Complete engineering services** offered for large mill installations are available with Speed Variator applications. G-E specialists will arrange operator's control station or desk layout to meet your special requirements. Regulating equipment can be adapted to various rolling mill characteristics. For example, this reversing cold strip mill can be used as a 4 high mill with 3- or 6-inch work rolls or can be used as a 2 high mill with 21-inch work rolls.

**Factory wired and tested,** the Speed Variator power unit comes ready to be installed. Drive components include operator's control station, power unit and drive motors. The rugged all steel cabinet of the power unit contains m-g set and controls in a compact enclosure.

**Find out** how this flexible, packaged source of d-c power can be used to best advantage in your mill. G-E engineers, specialists in steel applications, are at your service. Contact your G-E Apparatus Sales Office. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.*

820-1

*Progress Is Our Most Important Product*

GENERAL ELECTRIC

# THE TREND TO CECO-DROPS...

**JAMESTOWN, N. Y.**

**SITUATION:** Growing sales were taxing production capacity of tool mfr's. forge shop. Had four belt-driven board drop hammers.

**SOLUTION:** Four Ceco-Drops now in operation —have been giving excellent service. Production is up—maintenance is down. "3 hours charged against Ceco-Drops in 42 days" —"One Ceco-Drop ran 108 hrs. (21 days) without maintenance or die work."

**ALLENTOWN, PA.**

**SITUATION:** Tool works had the problem of keeping 23 "old dog" board drop hammers operating profitably. Had but one recent model "J" Chambersburg Board Drop.

**SOLUTION:** Management launched a modernization program calling for nine Ceco-Drops capable of producing a yearly tonnage in excess of the 23 old board drop hammers. Four of the Ceco-Drops are now in operation, shop layout has been revised. Efficiency and production methods have been improved.

**SKOKIE, ILL.**

**SITUATION:** One of largest manufacturers of hand tools is planning a new shop. Decided to have modern Gravity Drop Hammers.

**SOLUTION:** Selected Ceco-Drops, and on a programmed basis is replacing board drop hammers with Ceco-Drops. To date, two 2,000 lb. Ceco-Drops and one 2,500 lb. Ceco-Drop are in operation — "Doing fine". Another 2,500 lb. Ceco-Drop on order.

**FLINT, MICH.**

**SITUATION:** Large Auto Co. with 16 Board Drop Hammers—(7 of them Chambersburg "J's")—ranging in age from 7 to 30 years. Lowered production rates and mounting maintenance costs.

**SOLUTION:** Started modernization in 1953. Converted* four "J's" with Ceco-Drop upper works. Cost and down time reduced —production up—operators like them. Other "J's" to be converted*. Ceco-Drops will replace older board hammers.

*Saves cost of anvil and foundation!

**COLUMBUS, O.**

**SITUATION:** Job shop with 5 Board Drop Hammers finds equipment obsolete—cannot compete with lower prices and higher production of other more modern shops.

**SOLUTION:** Initiated 10 year program of modernization to include 15 Ceco-Drops. Three Ceco-Drops already installed to replace board drop hammers.

*The gravity drop hammer with short stroke control*

***. . . and remember the Lansing Story?***

**LANSING, MICH.**

Lansing, Mich. is unique among industrial cities in the concentration of drop forging activity in its many factories. It may well claim the title of "Drop Forging Capital of the World". In Lansing are six great forging shops covering 14 acres of land, with a working area of 985,579 sq. ft. All these great forging shops are using Chambersburg Ceco-Drops.

**Forge Shop No. 1**—installed the first Ceco-Drop in 1947—now forging connecting rods.

**Forge Shop No. 2**—has installed 6 Ceco-Drops since 1950—making automotive forgings.

**Forge Shop No. 3**—bought 4 Ceco-Drops since 1948—Commercial and automotive forgings.

**Forge Shop No. 4**—bought seven Ceco-Drops in the last six years.

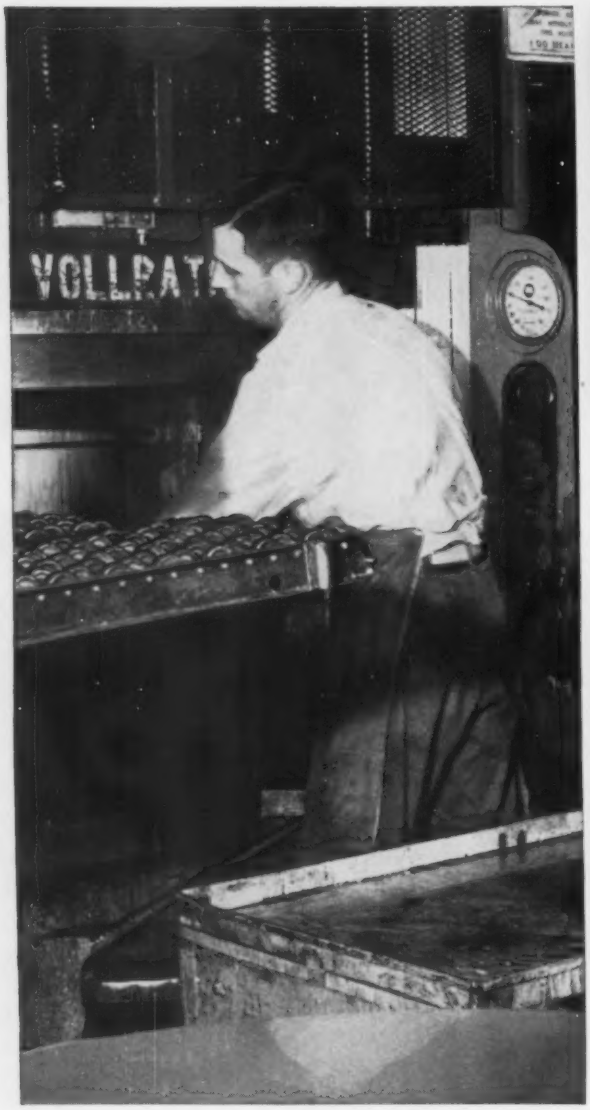
**Forge Shop No. 5**—Purchased 3 Ceco-Drops in 2 years.

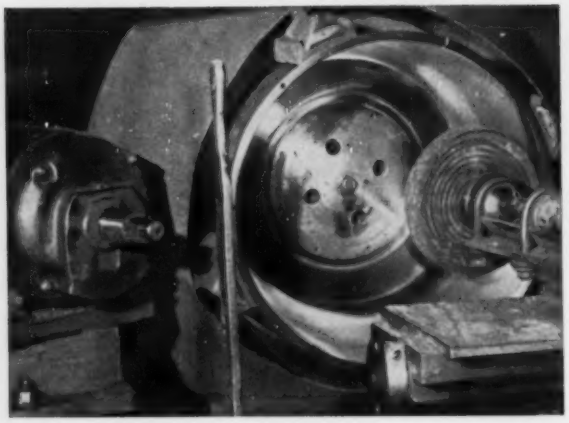
**Forge Shop No. 6**—One of largest in world Installed 11 Ceco-Drops since 1951.

## CHAMBERSBURG ENGINEERING CO.

CHAMBERSBURG • PENNSYLVANIA

# Here's proof of ENDURO'S





*Above*—After deep drawing, tub is polished, buffed and ready for shipment.

*Left*—In a single operation, a circular steel blank is drawn into a tub. This is a 50% reduction.

*Below*—Installed in the Speed Queen Automatic Washer, the stainless tub adds sales appeal, will last a lifetime.

# REPUBLIC

REPUBLIC STEEL

*World's Widest Range of Standard Steels*

# ductility . . .

## Vollrath makes stainless steel washer tub in one deep draw

The Vollrath Company, Sheboygan, Wisconsin, makes a quality line of special stainless steel products for many industries including chemical, dairy, food processing and appliance.

One of the most interesting products, from a fabricating standpoint, is a stainless steel washer tub made for the Speed Queen Automatic Washer.

Vollrath craftsmen start with a circular blank of Republic ENDURO Stainless Steel, Type 430. Then, in a single operation, they draw the blank into a tub. What makes it unusual is the extremely deep draw in which the diameter of the blank is reduced 50%. This is proof of ENDURO's ductility.

But, uniform ductility is only one advantage of ENDURO. It offers a combination of mechanical, heat-resisting and corrosion-resisting properties that no other commercial metal can match. And it is not difficult to fabricate, just different.

Republic produces ENDURO Stainless and heat-resisting steels in bars, slabs and billets, forging blanks, cold drawn shapes, plates, sheets, strip, tubing, tube rounds, wire and welding rod.

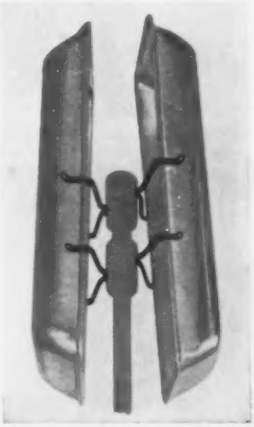
Our metallurgists and machining specialists will help you apply ENDURO to your product or process. There's no obligation. Mail the coupon if you would like one to call at your plant.

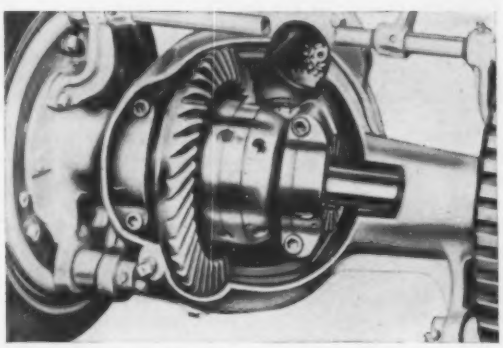
**STEEL**

*and Steel Products*

**HERE'S PROOF OF MACHINABILITY** — This spiral milled shaft is the heart of a ratchet-type screw driver. It bears the full load of the twisting operation. Excellent machinability of Republic Cold Drawn Steel helps the manufacturer achieve uniform high quality in each shaft. Cold drawing provides additional benefits in improved physical properties.

**HERE'S PROOF OF CORROSION-RESISTANCE** — A producer of ice trays and grids increased anodizing rack life 100 times by switching from aluminum to Republic Titanium. Its stubborn resistance to most forms of chemical attack, and total resistance to salt water make Republic Titanium an economical long-term investment. Investigate Republic Titanium for your parts that must withstand severe service.





**HERE'S PROOF OF STRENGTH AND TOUGHNESS** — This axle performs double duty. It drives a lift truck and bears the full weight of whatever is being lifted, including loads up to 100,000 pounds. By taking full advantage of Republic Alloy Steel's superior strength and resistance to fatigue, shock and stress, the manufacturer insures safety, extends equipment life, cuts maintenance and replacement costs.

**REPUBLIC STEEL CORPORATION**
**Dept. C-2060**
**3104 East 45th Street • Cleveland 27, Ohio**

☐ Have a stainless steel metallurgist call.
Send more information on:

☐ ENDURO® Stainless Steel ☐ Cold Drawn Steels
☐ Titanium ☐ Alloy Steels

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

# MUELLER BRASS CO.

# improves LENSOMETER

# lower cost

FORGED PART APPROXIMATELY ½ SIZE

Precision and extreme accuracy are vitally important functions of the Lensometer, manufactured by the Instrument Division of the American Optical Company, Buffalo, N. Y. The Lensometer is used to determine the focal strength and axis of an optical lens and, consequently, must be extremely precise in operation to provide accuracy and uniformity in lens prescriptions.

Forgings made by the Mueller Brass Co. play an important role in the construction of the Lensometer and contribute to its outstanding performance. Formerly, the body of the Lensometer was produced from *three* sand castings, but these now have been replaced by just *two* forgings. Naturally, this simplifies assembly, and the big forged bronze main support arm, shown above, along with the lens support bracket insures the constantly accurate alignment of the instrument. During the first year when forgings were used instead of castings, American Optical not only recovered the initial tooling costs but also realized considerable savings on each Lensometer produced. This is another good example of the way Mueller Brass Co. forgings can benefit a product two ways . . . better performance and lower costs. Chances are, your product can likewise be improved at a savings to you if you specify brass, bronze or aluminum forgings made by the Mueller Brass Co.

# FORGING

# at substantially

• WRITE TODAY FOR THE ENGINEERING MANUAL YOU NEED

Mueller Brass Co. Forgings Engineering Manual H-58565 ☐

Tuf-Stuf Aluminum Bronze Alloys Engineering Manual H-58563 ☐

600 Series Bearing Alloys Engineering Manual FM-3000 ☐

Copper Base Alloys in Rod Form Engineering Manual FM-3010 ☐

## METALS AND ALLOYS REVIEW

by FRANK M. LEVY

Vice-President and Director of Research

One of our most interesting series of alloys is the group which we market under the tradename "Tuf-Stuf" . . . a group of aluminum bronze alloys with range and flexibility to meet the most demanding needs. They are high copper base alloys containing from 9% to 13% aluminum and varying amounts of iron, nickel and manganese. Being free of zinc, they are not subject to dezincification. Tuf-Stuf alloys have a low coefficient of friction, good wearing qualities, high tensile strength, high hardness and the ability to withstand heavy pounding. Some of the alloys can be hardened by heat treatment. In the harder grades, these alloys are used for heavy duty service where high compressive loads are encountered and where lubrication may be scant. Present day increases in operating speed of modern machine equipment and the economy of little or no machine "down" time has made Tuf-Stuf popular in the machine tool industry. It is used in a multitude of applications where resistance to wear is important, such as: Drill Jigs, Feed Nuts, Rollers, Cams, Collets, Gibs, Gears, Boring Bar Guides, Lead Screw Nuts and Clutch Shifter Forks. Also, because of their ability to withstand higher stresses and resist season-cracking, these alloys are ideally suited for threaded nuts and bolts and pole-line hardware.

The unusual physical properties of the Tuf-Stuf series have made it particularly useful in the chemical and allied industries. These alloys combine the strength and ductility of medium steel with high resistance to corrosion by many chemicals. Tuf-Stuf alloys will not only resist oxidation at elevated temperatures, but will also retain a greater portion of their strength and hardness at these temperatures than will the copper zinc alloys. These properties make them ideal in the aircraft industry for valve seat inserts, spark plug bushings, valve guides and propeller hub cones.

Tuf-Stuf alloys are supplied as forgings, rod or screw machine products. As forgings the grain structure can be controlled to produce parts that are strongest at points of greatest stress and strain. Relatively intricate shapes can be forged to closer tolerances than sand castings. Where appearance is a factor, a forging may easily prove more economical since a minimum amount of machining, buffing or polishing is required before finishing.

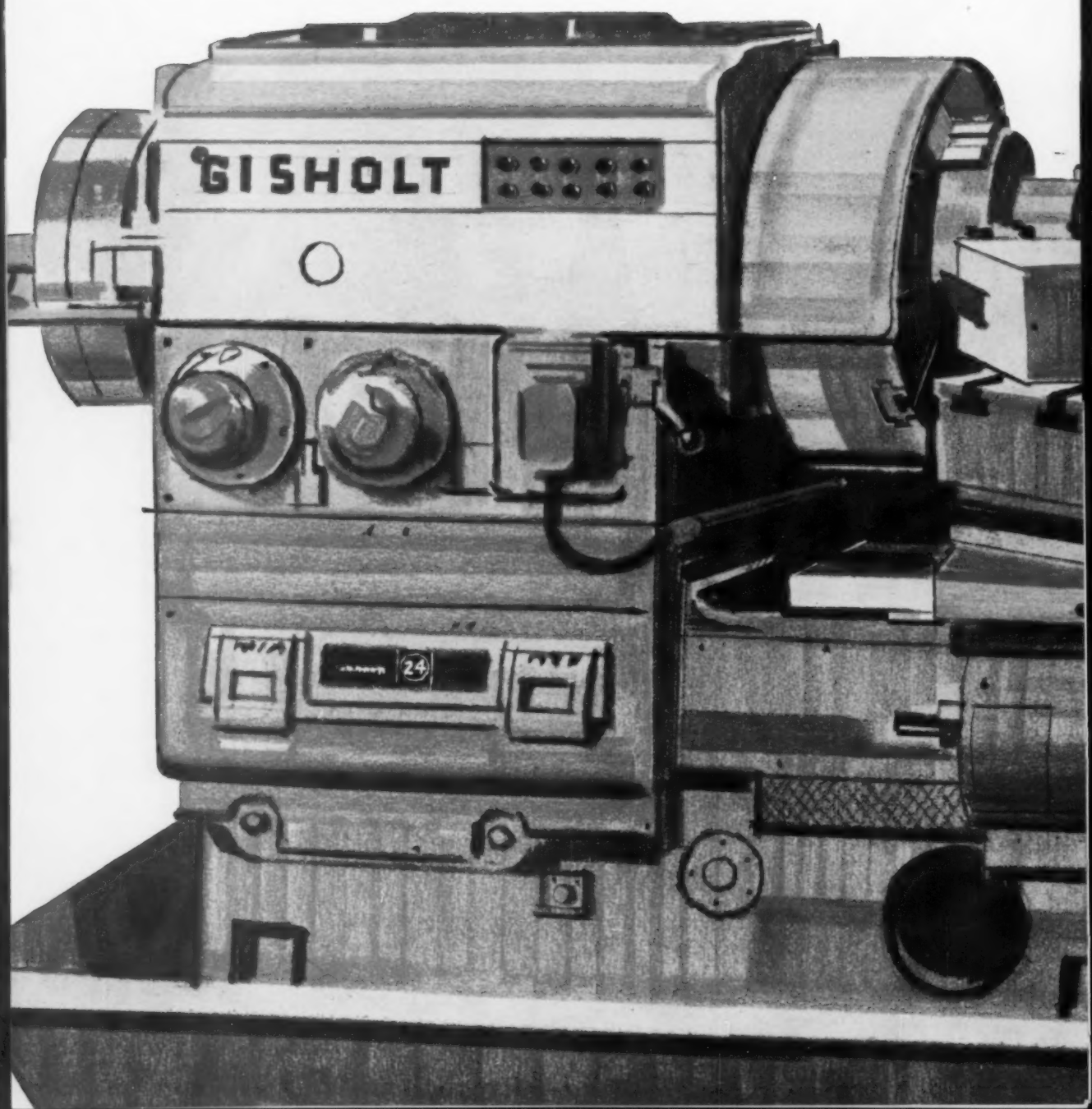
If you'd like more information about this series of alloys, drop me a line or better yet, send me your sample part or blueprint and an explanation of its use and we'll be glad to submit our recommendations.

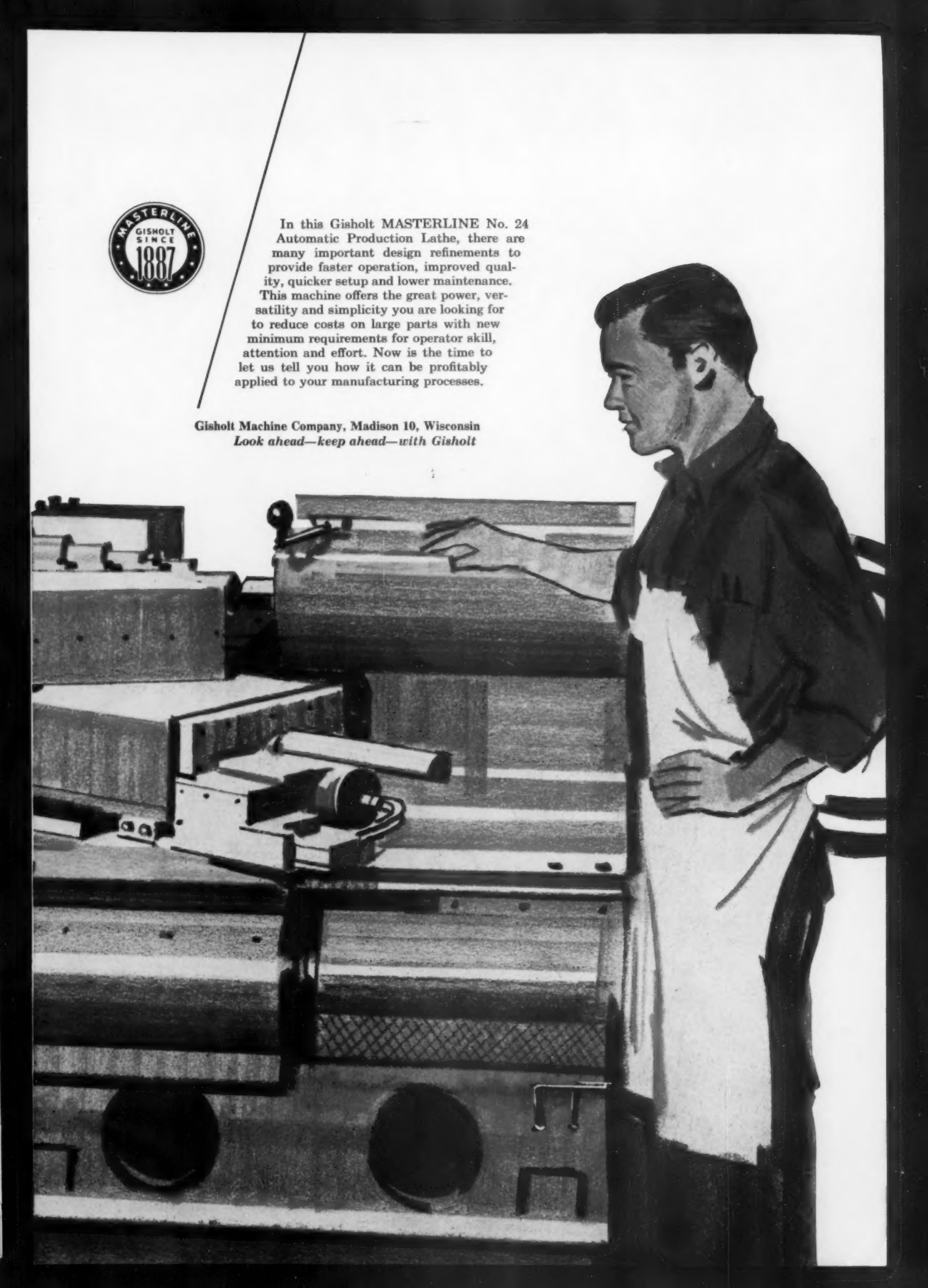
# MUELLER BRASS CO.

PORT HURON 24, MICHIGAN

178

# GISHOLT MASTERLINE
# NO. 24 AUTOMATIC
# PRODUCTION LATHE






In this Gisholt MASTERLINE No. 24 Automatic Production Lathe, there are many important design refinements to provide faster operation, improved quality, quicker setup and lower maintenance. This machine offers the great power, versatility and simplicity you are looking for to reduce costs on large parts with new minimum requirements for operator skill, attention and effort. Now is the time to let us tell you how it can be profitably applied to your manufacturing processes.

**Gisholt Machine Company, Madison 10, Wisconsin**
***Look ahead—keep ahead—with Gisholt***

**Easy to Mix.** Just add water according to instructions. Mixes in about five minutes.

**Consistency of Mix** is as workable as any cement mix.

**Pours Readily** into any prefabricated form.

# New ALUNDUM* 33-I insulating castable...mixes and pours like concrete...protects to 3300°F.

## A New Norton Refractory Rx

Now you can protect critical areas in your furnaces and other high temperature equipment to 3300°F with ALUNDUM 33-I insulating castable — a new, easy-to-install NORTON Refractory Product.

- 33-I comes in dry form in moisture-protective bags.
- 33-I — You just add water according to instructions. Mixes readily.
- 33-I pours into any prefabricated form like a concrete mix.

*And . . .*

- 33-I insulates up to 3300°F.
- 33-I is light in weight and monolithic in structure.
- 33-I saves down time for repairs.

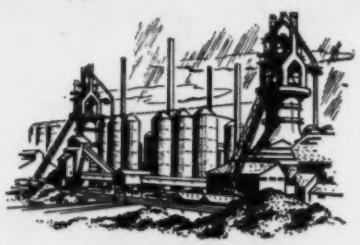
*Characteristics of ALUNDUM 33-I*

| | |
|---|---|
| Density | 100 lbs. per cu. ft. |
| Setting up time | |
| Stiffens | 1 hr. |
| Initial set | 4 hrs. |
| Final set | 18-24 hrs. |
| Chemical Analysis — $Al_2O_3$ | Primarily |
| $SiO_2$ | < 0.1% |
| $Fe_2O_3$ | < 0.1% |
| Maximum hot face temperature | 3300°F |
| Water added per 100 lbs. | Approx. 4¼ gals. |
| Grain Size | 6F |

This newest Norton refractory Rx is *engineered and prescribed* for maximum protection and quick, easy installation in a wide range of uses. For further facts on ALUNDUM 33-I insulating castable, write to NORTON COMPANY, Refractories Division, 205 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

*Typical Applications in Metal Processing*

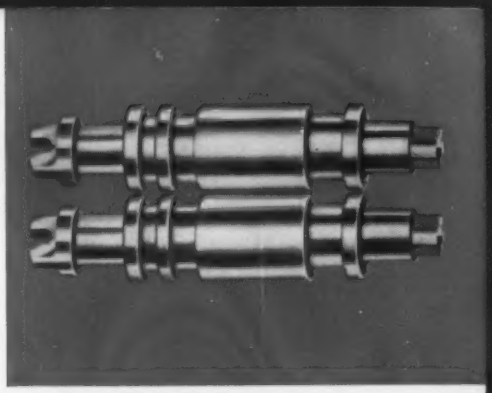


Linings for atmosphere furnaces. Insulation for pit furnace linings.

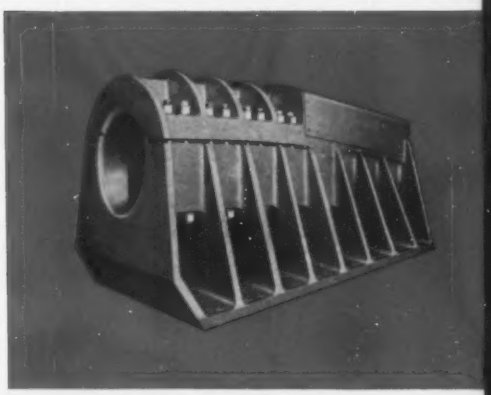
NORTON
REFRACTORIES
Engineered... Rx ...Prescribed
*Making better products... to make your products better*

CONTINENTAL
CONTINENTAL

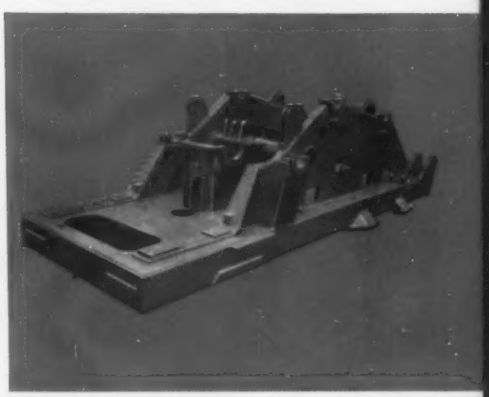
**CONTINENTAL** 40-inch, 2-high reversing blooming-slabbing mill in the Fairless Works of the United States Steel Corporation.



**ROLLS**—Iron, alloy iron and steel rolls for all types of rolling mills.



**CASTINGS**—carbon and alloy steel castings from 20 to 250,000 pounds.



**WELDMENTS**—fabricated steel plate, or cast-weld design.

# BLAW-KNOX

## makes what it takes to handle tough blooming-slabbing operations

In operation as an intermediate mill for subsequent rolling, this rugged Continental 40-inch reversing blooming-slabbing mill is providing excellent performance in the United States Steel's Fairless Works.

Variations of the basic design of this mill are built by Blaw-Knox to serve as break-down mills for billet and bar mills, rail and structural mills, and merchant mills.

Blaw-Knox designs and builds complete rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

50th Anniversary
BLAW-KNOX
1906-1956

CONTINENTAL
Foundry & Machine

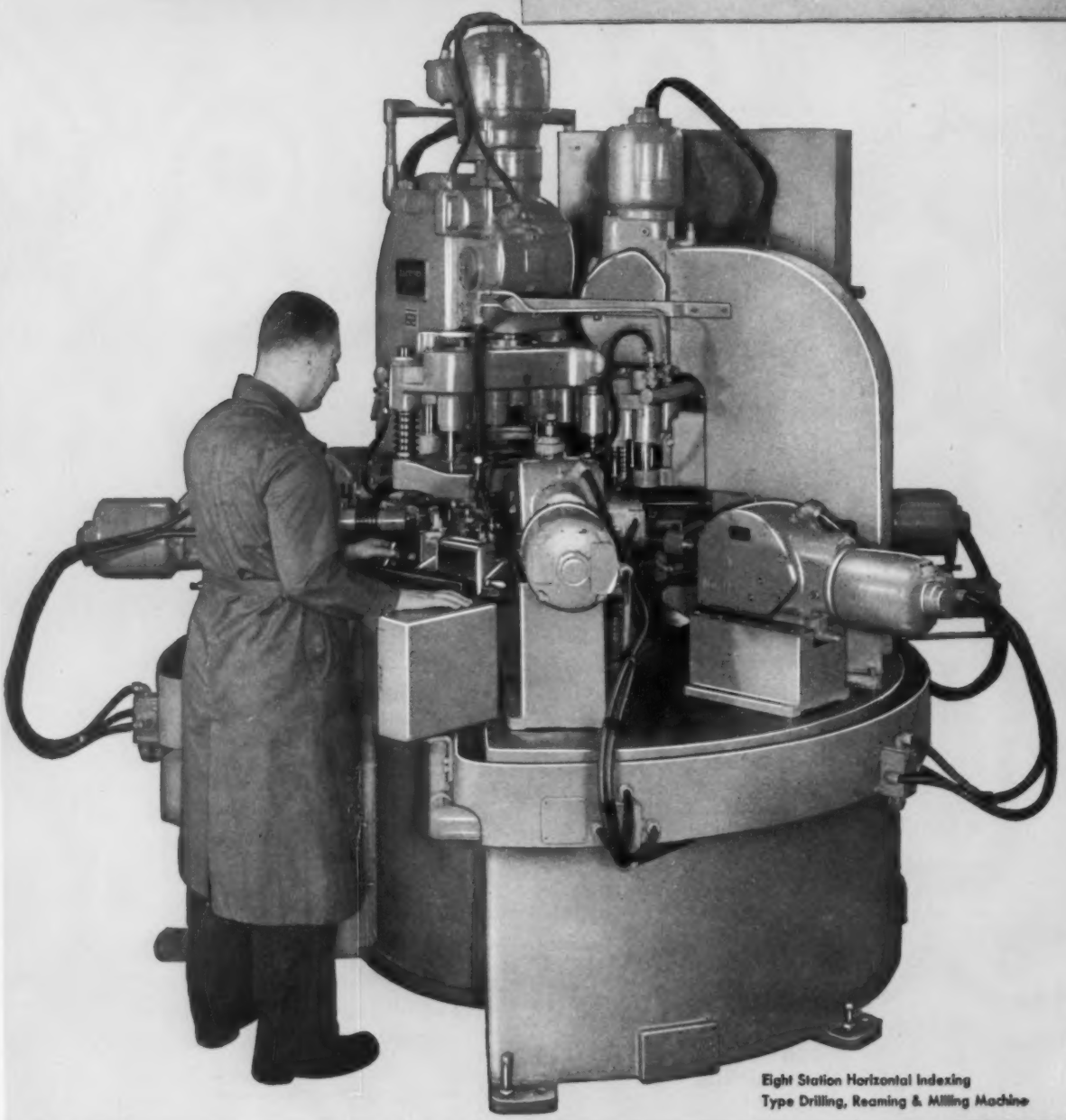
**BLAW-KNOX COMPANY**
***Foundry and Mill Machinery Division***
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment

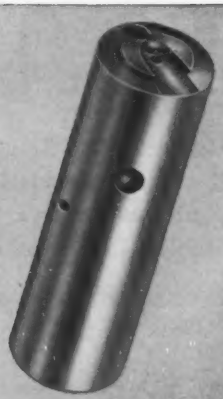
# HARTFORD *Special*

# AUTOMATIC performs

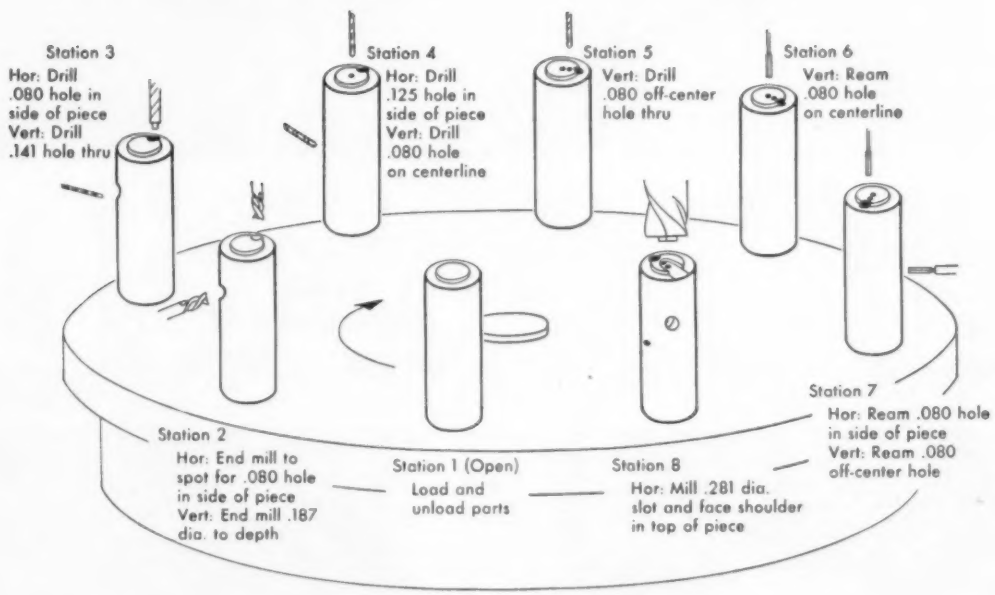


Eight Station Horizontal Indexing
Type Drilling, Reaming & Milling Machine

# PRODUCTION MACHINE 1100 operations per hour on intricate gun parts



**11 spindles working simultaneously in this 8 station automatic power indexing machine provide manufacturer with highest part quality on a high volume basis. Another example of better products at lower cost through better methods.**


Station 3
Hor: Drill .080 hole in side of piece
Vert: Drill .141 hole thru
Station 4
Hor: Drill .125 hole in side of piece
Vert: Drill .080 hole on centerline
Station 5
Vert: Drill .080 off-center hole thru
Station 6
Vert: Ream .080 hole on centerline
Station 7
Hor: Ream .080 hole in side of piece
Vert: Ream .080 off-center hole
Station 2
Hor: End mill to spot for .080 hole in side of piece
Vert: End mill .187 dia. to depth
Station 1 (Open)
Load and unload parts
Station 8
Hor: Mill .281 dia. slot and face shoulder in top of piece

Designing and building automatic production machines like this are a "Hartford" specialty. The use of ***standard*** machine components — mechanical and hydraulic drill units, machine bases, power operated indexing tables — means lower cost to you. The skill and experience of our engineers results in dependable higher production. Consider this combination for *your* parts processing problem.

**MACHINE TOOL DIVISION**
**THE HARTFORD SPECIAL MACHINERY CO.**
**2836 HOMESTEAD AVE., HARTFORD 12, CONN.**

**HARTFORD** *Special*

# It's Allis-Chalmers . .

**Motors, M-G Sets, Control, Switchgear... Dependable Allis-Chalmers Electrical Equipment Plays an Important Role in Steel Mill Expansion Programs**

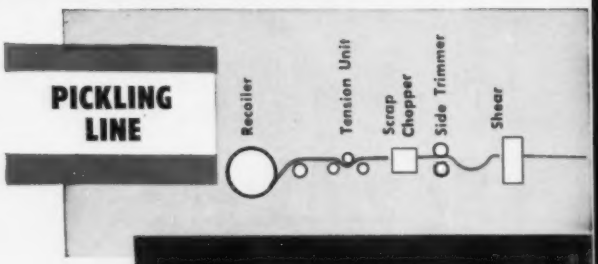
Demand for specialized steel remains at a record high. Steel producers are meeting the challenge with improvements on existing processing lines, or installation of new facilities for pickling and annealing operations.

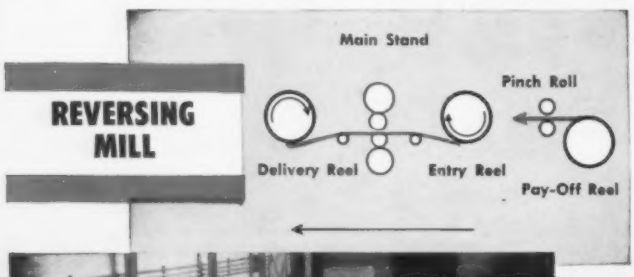
A recent installation of this type in an eastern steel mill featured Allis-Chalmers motors, m-g sets, control and operating stations, and switchgear throughout.

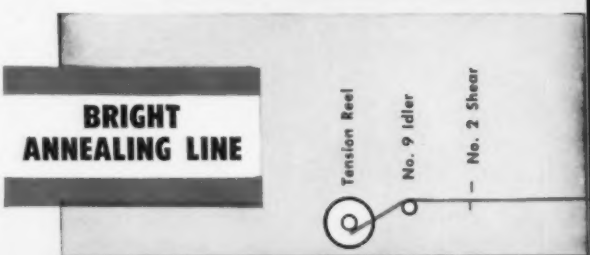
Allis-Chalmers equipment was chosen for this duty because of its record of quality, economy, durability . . . proven in years of heavy-duty steel mill operation.

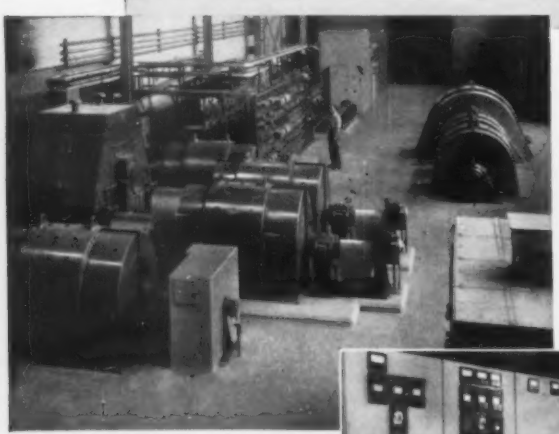
Take advantage of Allis-Chalmers wide range of equipment and service. For help in planning new facilities or modernizing present plants, contact the A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

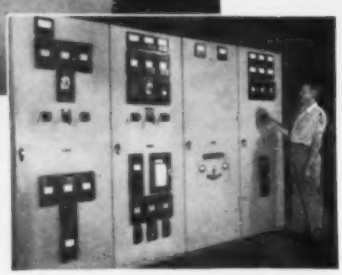
A-4872





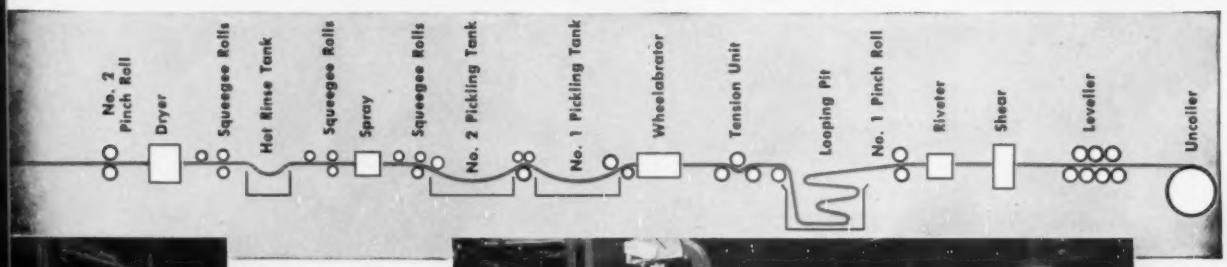


Overall view of new reversing mill motor room showing main motors, m-g sets, control, and 11,000/480-volt substation. Inset shows Allis-Chalmers 15-kv high voltage switching equipment for the motor-generator set and substation.

Delivery end of new annealing line. Allis-Chalmers desk-type operators' control stations, as shown here, are used throughout these modern new facilities.

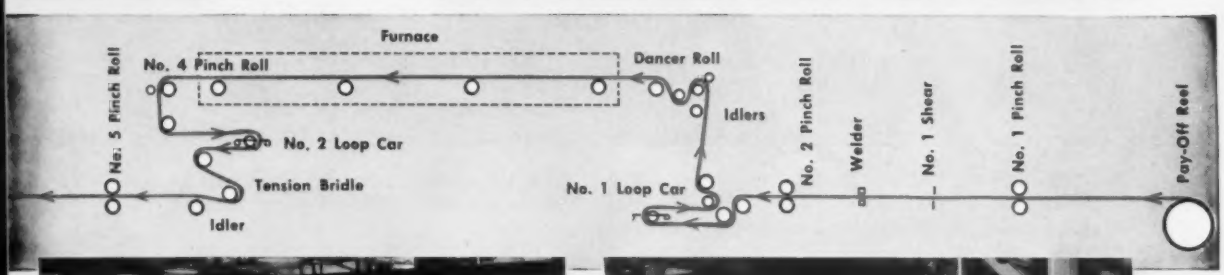
**ALLIS-**

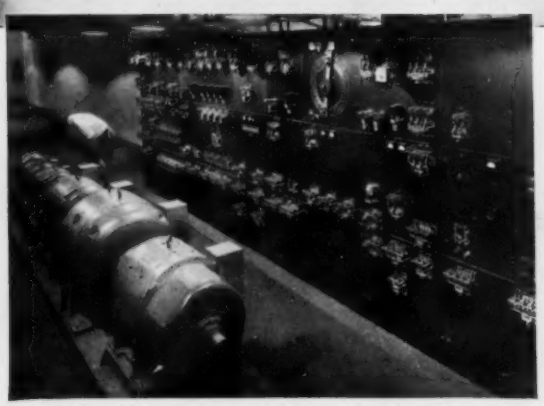
# . All Along the Line



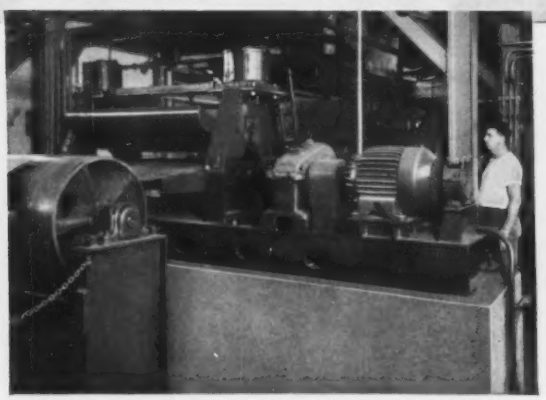
Operator's station, entry end, 36-inch hot-rolled pickling line. Allis-Chalmers control, initiated from desk, gives positive, precision control of material speed.

Allis-Chalmers dc control board and metering panels, m-g set, on delivery section of the pickling line.



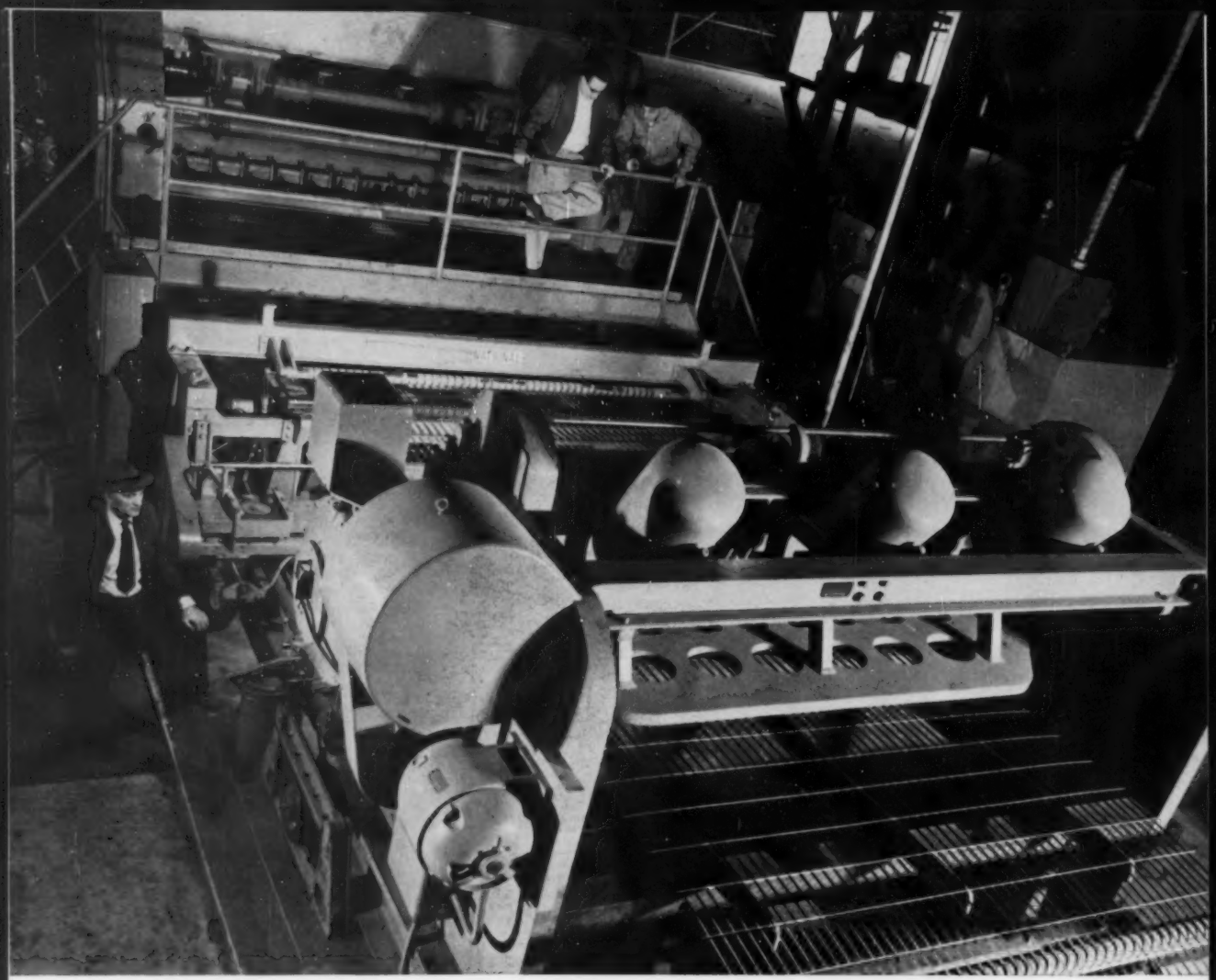
Allis-Chalmers m-g set and dc control board on the annealing line. Allis-Chalmers m-g sets and controls are recognized in the steel industry for dependable, economical service.



Pinch roll drive on delivery end of annealing line. Allis-Chalmers fan-cooled motors drive various parts of the processing line.

**CHALMERS**

A-C ALLIS-CHALMERS



**NEW FABRIC WELDING MACHINE**—This half-million dollar installation can handle wire from 7-0 gage to 8 gage to make fabric for use in reinforcing concrete pipes, buildings and other applications.

**TIGHTENING 7,000-POUND COIL**—Rolls of wire fabric up to 96 inches wide can be produced on new wire fabric machine. Here a huge coil is being prepared for removal to shipping docks.

# NEW Progress at Pittsburgh Steel Company

By the end of 1958, America's steel industry will have grown from a 1955 ingot capacity of 128 million tons to 143 million tons annually. Steel companies—large and small—are investing more than a billion dollars a year as they strive to keep pace with the nation's ever-expanding need for steel.

Responding to trade demands for new lines of finished products, Pittsburgh Steel Company is in the forefront of the industry's expansion. Its current improvement and expansion of production facilities is the second major program of growth at Pittsburgh Steel since 1950. The first—the Program of Progress—cost 65 million dollars; the current project totals 15 million dollars.

Just eight months ago, the five-phase project was still in blueprint stages. But now, with work proceeding on or ahead of schedule, 80 percent of the project will be completed by year's end. The remainder will be concluded by the end of 1957's first quarter. Thus, Pittsburgh Steel will have contributed a 14 percent increase of its basic capacity a year and a half before the entire industry expansion is in full operation.

This expansion-improvement program is already generating benefits for Pittsburgh Steel and its customers. Photographs here show one of the five phases—a brand new automatic wire-welding machine now in production at Pittsburgh Steel's Monessen, Pa., Works. Capable of turning out heavier wire mesh and fabric up to 96 inches wide, the new machine sharply increases the diversity of Pittsburgh Steel's mesh and fabric line. It will handle wires from ¼ inch in diameter to the heavier ½-inch gages.

The new fabric installation is the first completed phase of the current program. About ready for production is a battery of modern new by-product coke ovens. They will enlarge Pittsburgh Steel's coke-making capacity by 25 percent. Heat has already been applied to the new battery. Coke production is scheduled to begin in late June just when finishing touches are being put on a blast furnace program to give Pittsburgh Steel fully modern iron-making facilities. After that, a major open hearth project and rehabilitation of primary rolling facilities will be rushed to completion. Basic ingot capacity will increase by 180,000 tons of steel a year as a result of the open hearth project.

Because of the current program, Pittsburgh Steel's thousands of customers are guaranteed more quality steel products in a range greater than the company has ever been able to offer in its more than 50 years of business.

Whatever your steel needs—hot and cold-rolled sheet and strip, cold-rolled coated and uncoated strip specialties, wire products from merchant trade to fine wire specialty grades, seamless tubular goods—YOU CAN DEPEND on Pittsburgh Steel, the quality of its products, the reliability of its service.

A member of Pittsburgh Steel's nationwide sales engineering staff is as close as your telephone. He'll be glad to discuss your steel needs.

**SKILLED KNOW-HOW PRODUCES QUALITY PRODUCTS—Years of experience in fabric-making back up the men running new machine. Man at controls, above, keeps an eye on wires passing overhead.**

**AT REEL CONTROL STATION—Another skilled operator makes sure fabric feeds correctly into coiler. Because the Fabric Department at Pittsburgh Steel is staffed with veterans, high quality is assured.**

## Pittsburgh Steel Company

**Grant Building • Pittsburgh 30, Pennsylvania**

**District Sales Offices**

| | | | | |
|---|---|---|---|---|
| Atlanta | Columbus | Detroit | New York | Tulsa |
| Chicago | Dallas | Houston | Philadelphia | Warren, Ohio |
| Cleveland | Dayton | Los Angeles | Pittsburgh | |

# How BRAINARD STRAPPING SERVICE cut pipe handling costs 20%

**FIVE TONS** of cumbersome pipe, held by four bands of ¾" .035 Brainard strap, are safely moved by overhead crane to a gondola car at the Sharon Tube Co., Sharon, Pa. . . . with a 20% saving in manhours and materials! Entire gondola car is then secured with 1¼" .035 Brainard strap. Loading time has been cut 60% from previous manual operations.

A Brainard expert worked out this successful, cost-cutting operation. No matter what you make, package or ship, a nearby Brainard representative can show you the way to similar savings. Call him today, or write . . .

Brainard

SHARONSTEEL

STEEL DIVISION
SHARON STEEL CORPORATION

**THE BRAINARD STEEL DIVISION**
of the Sharon Steel Corporation
Dept. I-6, Griswold St.
Warren, Ohio

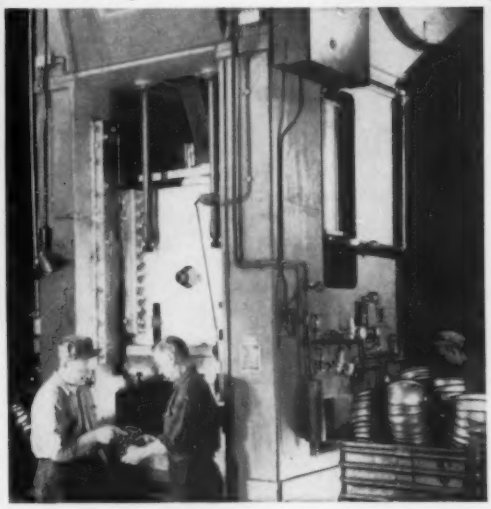
MAKERS OF QUALITY STEEL STRAPPING

# BARIUM STEEL—active in America's growth

**MILITARY AVIATION'S** most widely used filler cap above is designed for fuel, oil, water and water-alcohol tanks as well as disposable tanks which can be dropped from the aircraft when empty. Barium's East Coast Aeronautics, Inc. produces it in 72 different models and in various sizes for pressures up to 100 psi through a wide temperature range.

**PROCESS INDUSTRIES,** with their ever-increasing need for steel pipe and high pressure tubing, get special treatment at Phoenix Iron & Steel Company's new seamless tube mill. This latest Barium unit is set up for commercial production of heavy wall pipe (above) over a wide range of special lengths, diameters and wall thicknesses. A good example of Barium's "step-ahead" thinking.

**CONSTRUCTION** men come to Barium for specials, too. Here at Erie Bolt and Nut Co. bolts, nuts, studs and machine parts—in quantities as small as a hundred units—are turned out to precise tolerances in a variety of alloy and standard steels. For facts on Barium's part in your industry's growth, write Barium Steel Corporation, 25 Broad Street, New York 4, N. Y.



**SHIPPING** cargoes get fast handling with giant Whirley cranes (single lift capacities to 83 tons) above, and Unloaders (capacities to 1200 tons per hour) from Barium's Clyde Iron Works, Inc. But king-sized materials-handling like this is only one job on which Barium delivers the goods faster. For a complete listing of our products and services see Thomas' Register, Section A to Z.

**APPLIANCE MANUFACTURERS** are cutting costs and weights of parts by as much as 40% here because Barium's Geometric Stamping Company is able to convert castings to stampings at considerable savings to its customers. This 250-ton straight side press with its 16 square-foot bed area helps Geometric maintain leadership in quality contract stamping.

**STEEL PRODUCERS**

Phoenix Iron & Steel Co. (Plate Div.; Structural Div.; Steel Tube Div.; Blast Furnace Div.)

**STEEL FABRICATORS & PROCESSORS**

Phoenix Bridge Company • Industrial Forge & Steel, Inc. • Globe Forge, Inc. • The Geometric Stamping Company

A GROUP OF INTEGRATED COMPANIES

**BARIUM**

STEEL CORPORATION

MANGANESE IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS

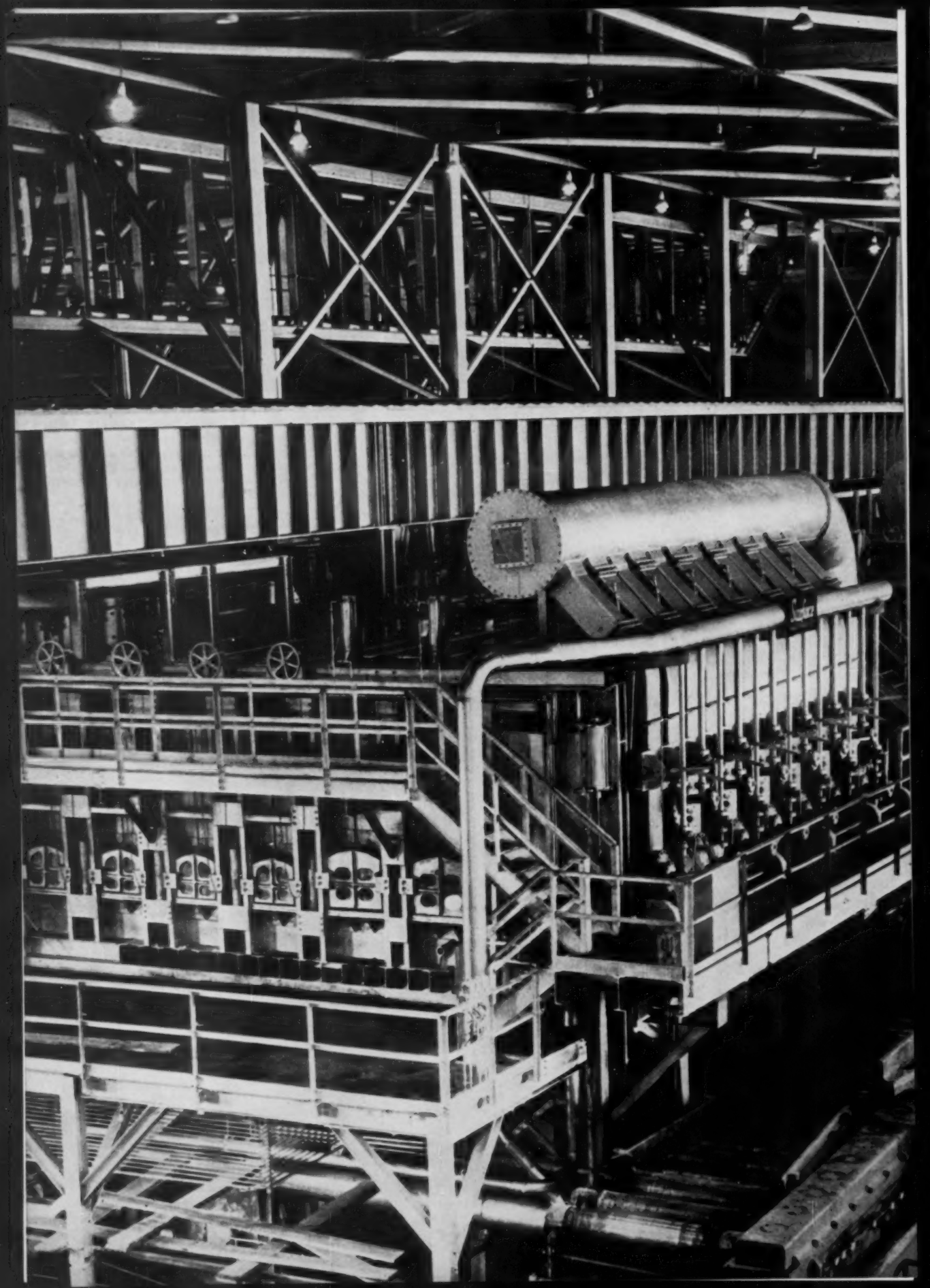
**MANUFACTURERS OF END PRODUCTS**

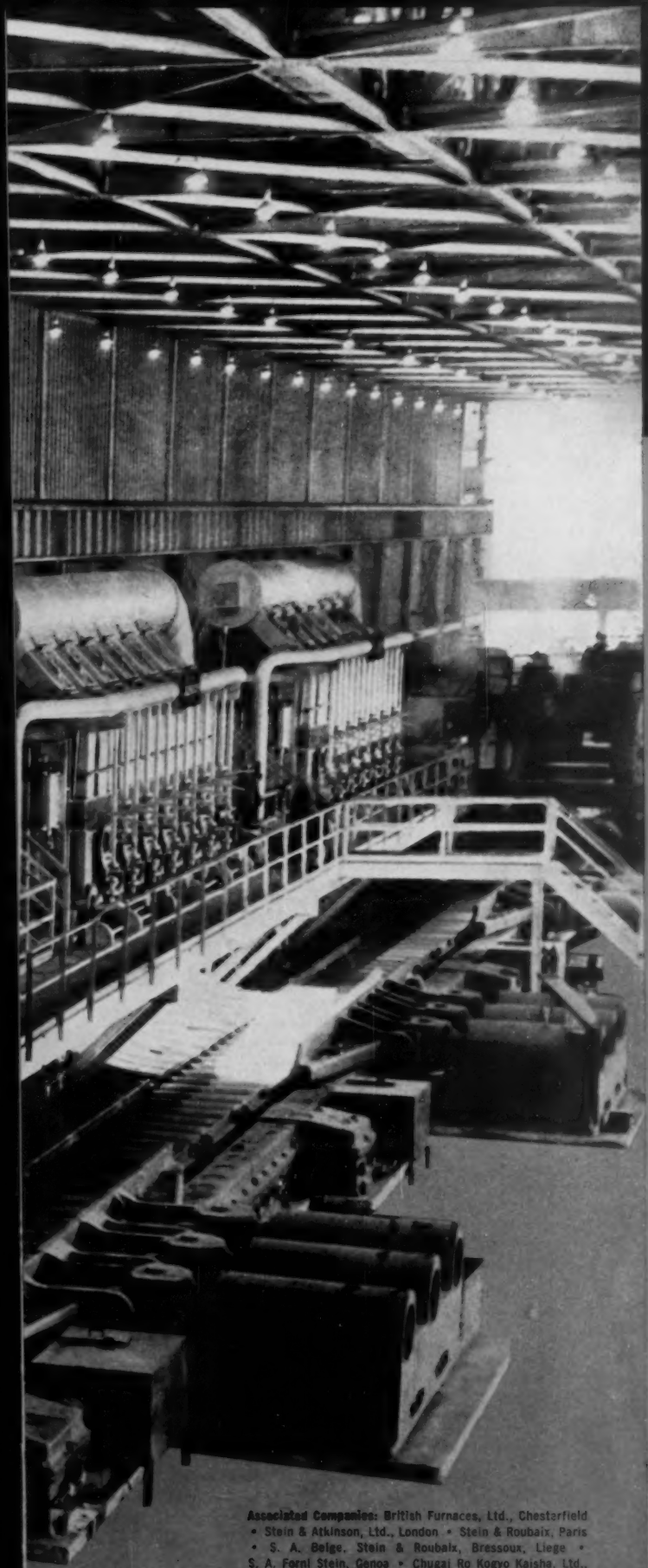
Clyde Iron Works, Inc. • Erie Bolt and Nut Company • Bayonne Bolt Corporation • The Cuyahoga Spring Company • Jacobs Aircraft Engine Company • Wiley Manufacturing Company

**LIGHTWEIGHT METAL AND PLASTICS**

East Coast Aeronautics, Inc.

6.2A





# 200 TONS AN HOUR CONTINUOUSLY

200 tons of steel slabs are heated to rolling temperature every hour, continuously, in each of these Surface monsters—world's largest slab furnaces.

No other furnace today can list all of these features:

1 Cantilever skid supports* permitting unobstructed combustion space for underfiring.

2 Furnace lines and burner design which provide high heat input from the moment the slab enters the furnace.

3 Built-in control* to prevent intermingling of gases from upper and bottom zones, providing better control of heat application, and preventing overheated slab end.

4 Anticipatory control which reduces temperature head when rate of slab discharge decreases.

5 Air preheat up to 1100°F.

6 Television signal to pusher pulpit, informing operator of the exact position of the leading slab.

About the only conventional feature in these giants is the fact that the slabs are pushed in one end and out the other.

This is another demonstration that, at Surface, unconventional thinking and conventional experience are a productive team for the steel industry. Surface Combustion Corporation, Toledo 1, Ohio.

*patents pending

Surface
STEEL MILL EQUIPMENT

**Associated Companies:** British Furnaces, Ltd., Chesterfield • Stein & Atkinson, Ltd., London • Stein & Roubaix, Paris • S. A. Belge, Stein & Roubaix, Bressoux, Liege • S. A. Forni Stein, Genoa • Chugai Ro Kogyo Kaisha, Ltd., Osaka • Benno Schilde Maschinenbau, A. G., Bad Hersfeld.

***No dezincification*** after Ni-Vee bronze parts replaced manganese bronze stems in water system valves such as these produced by water works equipment manufacturer, Rich Mfg. Co., Los Angeles, Calif.

# How Ni-Vee bronze valve stems halt failures in water system

VALVE STEM BREAKAGE puzzled and plagued water system engineers in the City of Los Angeles.

Cause of the trouble? Dezincification. A form of corrosion that sapped strength from manganese bronze stems in cast iron valve bodies.

Finally city engineers found the answer. As a result of 5-year tests of copper-base alloys in a variety of waters, these engineers turned to valve parts cast in Ni-Vee* nickel-tin bronze.

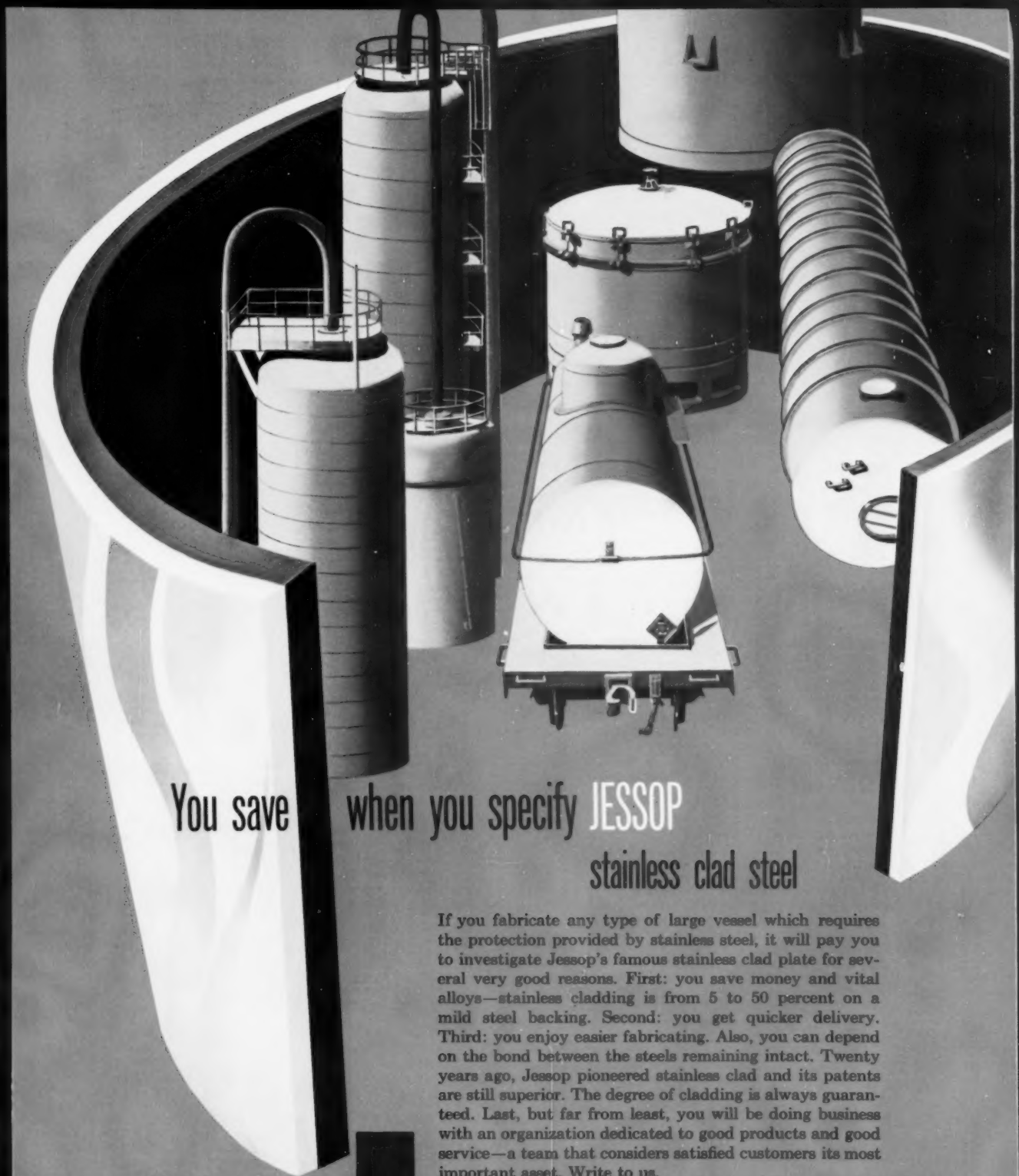
### *High mechanicals*

Containing less than 2% zinc, mainly for scavenging in the melt, Ni-Vee bronze stays immune to dezincification. Thus, it retains its original strength indefinitely. But that's only part of the story.

Ni-Vee bronze gives you high "as cast" tensile strength which simple heat treatment can lift up to 90,000 psi. In addition, this bronze resists wear, impact and galling. It offers easy castability, low shrinkage, pressure tightness, fine grain. Versatility plus economy.

Avail yourself of the money-saving advantages afforded by this simple family of five outstanding Ni-Vee bronzes. Use them anywhere copper-base cast alloys have application for pressure, constructional and bearing needs. And write for your copy of *"Engineering properties and applications of NI-VEE BRONZES."* Do it now. *Registered trademark

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.



# You save when you specify JESSOP stainless clad steel

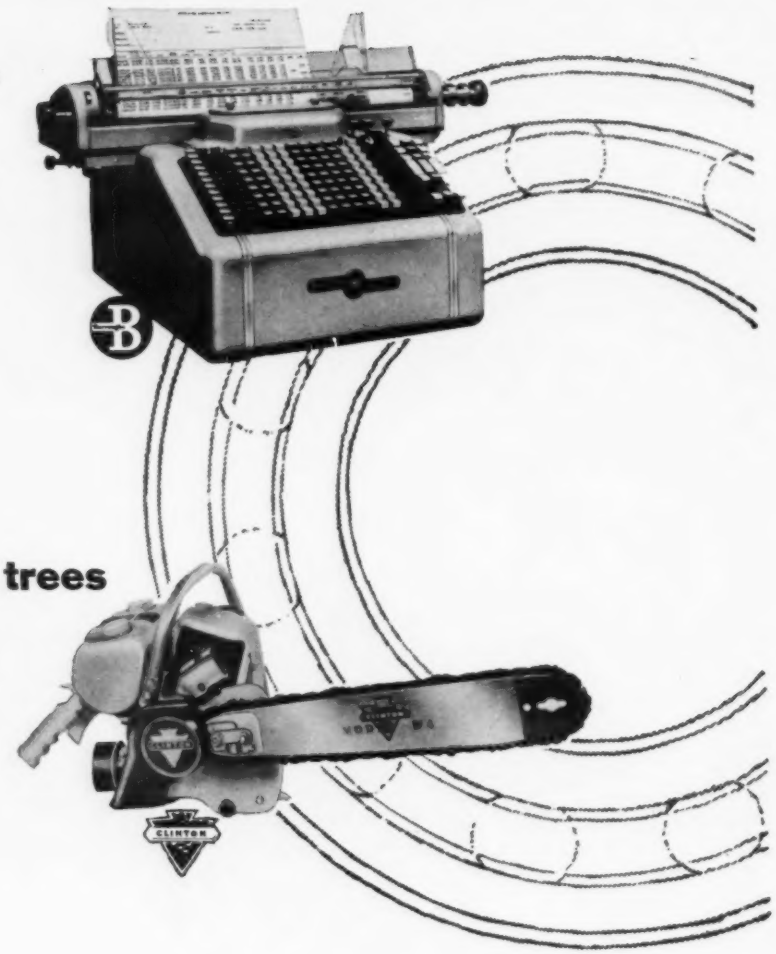
If you fabricate any type of large vessel which requires the protection provided by stainless steel, it will pay you to investigate Jessop's famous stainless clad plate for several very good reasons. First: you save money and vital alloys—stainless cladding is from 5 to 50 percent on a mild steel backing. Second: you get quicker delivery. Third: you enjoy easier fabricating. Also, you can depend on the bond between the steels remaining intact. Twenty years ago, Jessop pioneered stainless clad and its patents are still superior. The degree of cladding is always guaranteed. Last, but far from least, you will be doing business with an organization dedicated to good products and good service—a team that considers satisfied customers its most important asset. Write to us.

# JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

## cutting through accounting costs...

*Push a few buttons and the "mechanical brain" of the Burroughs Sensimatic takes over, posting records with amazing speed and accuracy. Smooth, quiet operation is of vital importance. Federal Ball Bearings are used here, too.*




## ...or cutting down trees

*Any woodsman becomes a Paul Bunyon with a Clinton Chain Saw. These rugged tools send timber toppling at a furious rate. They've got to be tough—and that goes double for the ball bearings. Clinton specifies Federals.*

# so much of industry *turns* on FEDERAL ball bearings

Deep in the nation's timberland...high in a skyscraper office building —wherever there's work to be done, you'll find labor saving, time-saving machines. And wherever you find machines, you'll find Federal Ball Bearings, in every size and description, making their vital contribution toward smooth, trouble-free performance. There are 12,000 sizes of Federal Ball Bearings to solve your anti-friction problems. Hundreds of types. Produced by a 50-year-old manufacturer of ball bearings exclusively.

When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make*?

**THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.**

*New! Ball Bearing and engineering data! 175 pages full in FEDERAL'S NEW CATALOG! To get your copy, just drop us a line.*

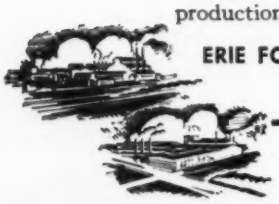
**Federal** **Ball Bearings** *One of America's Largest Ball Bearing Manufacturers*

# STEEL CASTINGS - 82 tons or 20 pounds ... Routine at Erie Forge & Steel!

A LONG JUMP from "the largest steel water wheel ever cast in one piece", 82 tons of it, to a 20 lb. engine casting . . . Routine at Erie Forge & Steel. Here is definite proof of our versatile production capabilities.

Engineers and metallurgists team up here with skilled craftsmen to control the production of steel castings and forgings from raw materials to finished product.

For example, engineering, metallurgy and production followed the 82 ton casting every step from raw materials to railroad spur to assure dimension and specification accuracy. "One responsibility and one control" is more than a slogan — here, it works for you.



**ERIE FORGE & STEEL CORPORATION • ERIE, PENNSYLVANIA**

MEMBER AMERICAN IRON AND STEEL INSTITUTE

ERIE FORGE & STEEL CORPORATION

# Matteson Equipment Company, Inc. now a subsidiary of E. W. Bliss Company

E. W. Bliss Company has acquired controlling interest in The Matteson Equipment Company, Inc., Poland, Ohio.

Matteson has designed and supervised construction of continuous annealing and pickling lines, galvanizing equipment, hot dip tinning equipment and other types of steel mill auxiliary equipment both here and abroad.

Until now, the manufacture of Matteson-designed products was handled by independent sub-contractors. As a subsidiary of E. W. Bliss however, the manufacturing facilities of the entire Bliss organization will be available to Matteson, thus making possible a closer degree of quality control and improved delivery schedules.

Likewise, the addition of Matteson designed equipment will supplement the wide range of rolling mill machinery now built by Bliss.

E. W. Bliss Company
GENERAL OFFICES: CANTON, OHIO

BLISS SINCE 1857 ®

*is more than a name . . . it's a guarantee*

This installation consisting of seven hand-propelled cranes on a flexibly suspended runway is used for stripping wire blocks in a large steel mill.

Note how easy it is with the Cleveland Tramrail design to position the runway at any level or location desired. Likewise, it is extremely simple to dismantle and relocate the equipment to serve some other application, should such ever be necessary.

# FLEXIBLE SUSPENSION

## *Assures Smooth Crane Operation*

CLEVELAND Tramrail's unique flexible suspension method of supporting crane runways prevents binding of wheels on the tracks and assures smooth easy rolling operation, regardless of location of the load on a crane bridge.

The floating runways compensate automatically for normal skewing or twisting of crane bridges.

This is one of the reasons why hand-propelled Cleveland Tramrail cranes can be used for so many jobs where motor-driven cranes would otherwise be required.

Operation is so easy that Cleveland Tramrail guarantees a starting effort of 15 lbs. and running effort of 10 lbs. per ton weight.

Write for free copy of illustrated booklet No. 2008, "Engineering and Application Data".

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

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**System**

**(truck + Load Lugger + Containers)**

Full container being placed on truck. Self-loading Load Lugger eliminates need for crane or crew—the Load Lugger driver does it alone, in seconds.

✓ *simplifies plant refuse disposal...*
✓ *eliminates multiple handling...*
✓ *cuts time 200% over former method*

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***PRESENT* METHOD:** Fork truck empties drums into Load Lugger containers strategically spotted outside the plant—a one-man, part-time job. Sludge is handled and dumped by fork truck directly into Load Lugger containers. The Load Lugger equipped truck transports the full containers to a refuse-dumping ground—round trip, 20 minutes. *At the end of each day, plant is entirely free of refuse.* What's more, the Load Lugger also handles pipe and other materials—*versatility* is a Load Lugger "plus-value"!

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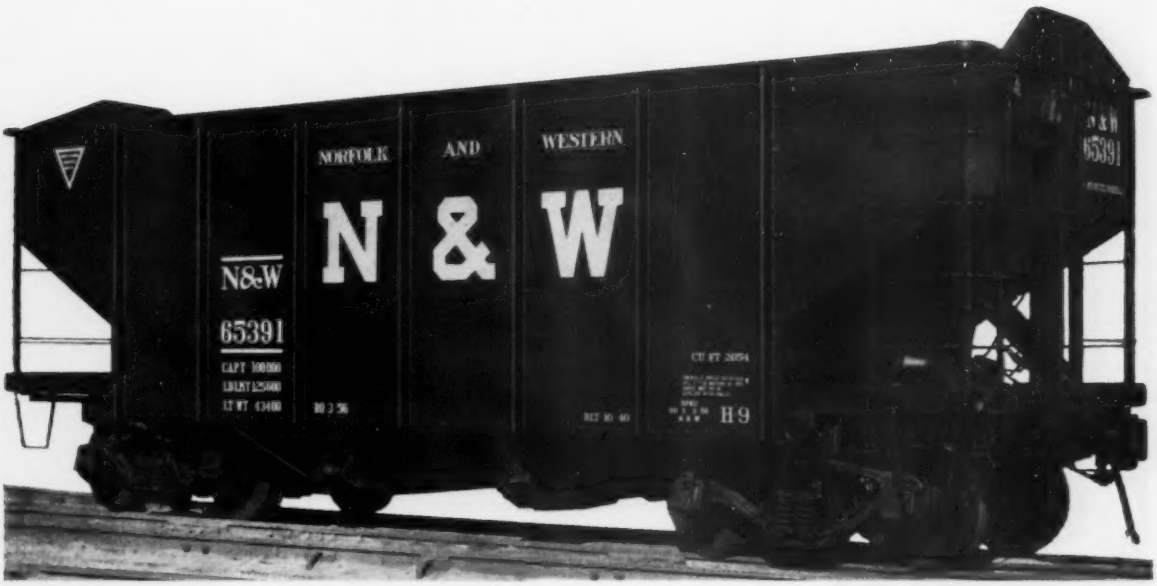


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Continuous research for modern processes to convert iron bearing rock to high grade iron ore stabilizes raw material for the American Steel Industry.

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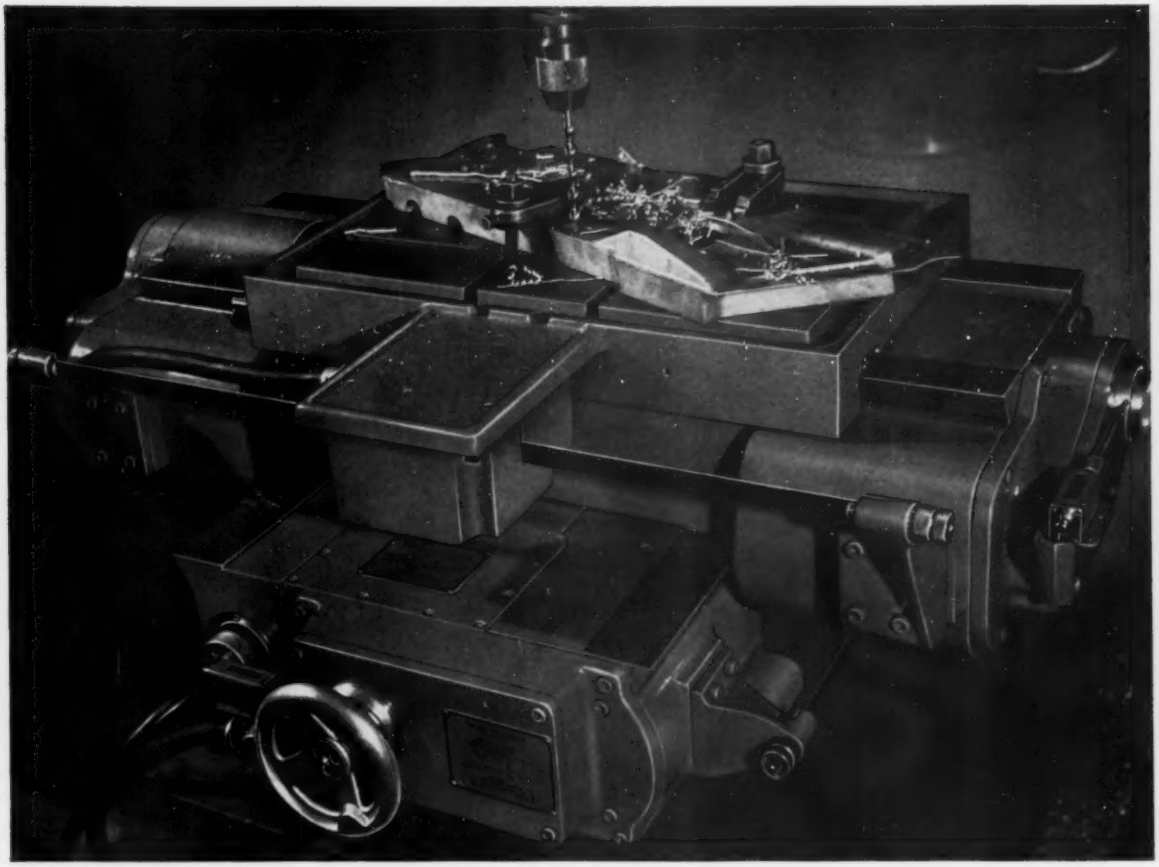

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*Write for Bulletin IA-6.*

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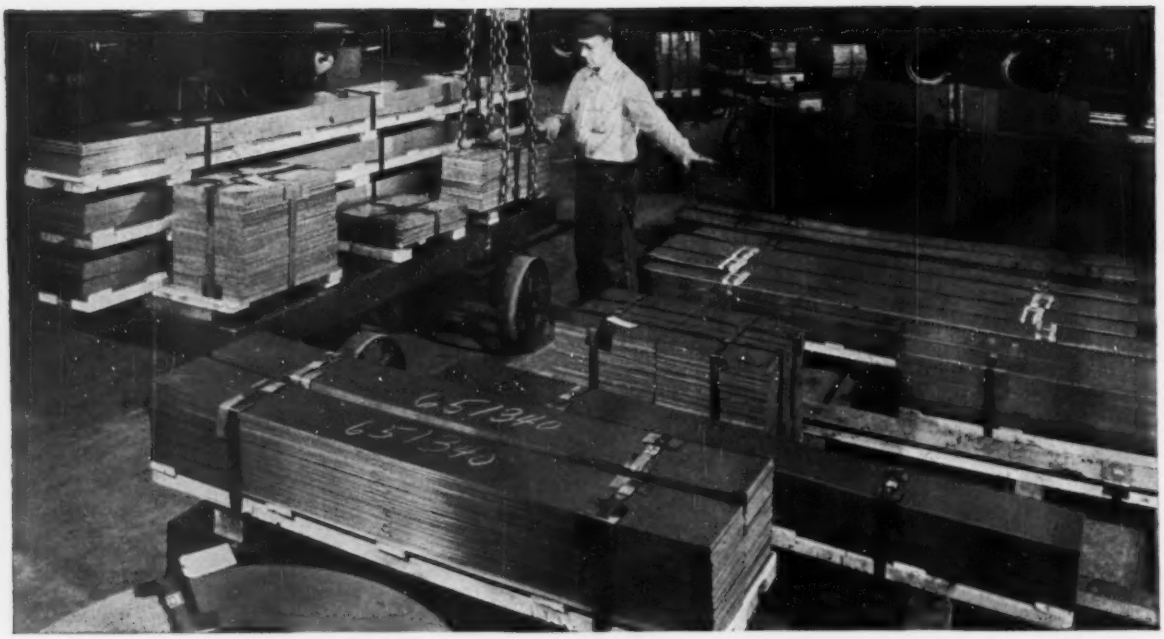

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When you need sheet and strip steel, cut to size and ready to use—call Ryerson. The separate sheet and strip division at your nearby Ryerson plant can handle practically any and every requirement for these products. And a staff of specialists working with the very latest equipment assures quick delivery of material in excellent condition—accurate to size and carefully strapped and skidded.

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*In stock: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.*

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# NEWSFRONT

### Formula Simplifies Rupture Testing

Long-time testing to determine metals' mechanical properties has been an expensive but seemingly unavoidable necessity. Rupture life tests have in some instances run for years. Now researchers have developed a simple mathematical formula expressing an empirical relationship between rupture life and minimum creep rate. It means long-time rupture life can be readily and accurately estimated once minimum creep rate has been established.

### So Who's Hurting?

Copper spokesmen insist that increased use of aluminum in autos isn't squeezing them. Representative of one major copper company says aluminum's replacing more steel than copper. Copper & Brass Research Assoc. agrees; reports average auto still carries 40-45 lb of copper; doesn't expect this amount to fall off appreciably in near future.

### More Sports Per Car

Increasing popularity of sports cars in this country has auto manufacturers casting about for more ways to exploit the growing craze. One resulting wrinkle: Watch for Ford Motor Co.'s introduction next year of a smart new four-passenger Thunderbird model.

### Retailers Sideline Steel Negotiations

Retailers and manufacturers selling to them will cheer if steel companies succeed in getting the long term contracts they're seeking. Yearly contract talks, even when they don't spell strike, tend to reduce buying by retailers. One kitchenware vendor reports that Pittsburgh area merchants began order cutbacks in May, have now almost stopped entirely.

### Electronics: Bright Sales Picture

Electronics equipment industry is doing all right. Industry spokesmen report sales for the fiscal year just ended (summer-to-summer) set an all-time record in dollar volume—$5.5 billion vs. $5.25 billion last year. Biggest ground gainer: industrial and commercial product sales, up from $625-million to $775-million. Military products segment is up $125-million. Amusement devices, only dark spot, showed $61 million decline.

### Railroads Upping Demurrage Charges?

Watch for a possible increase in demurrage charges on railroads beginning Sept. 1. Proposal is up for approval by freight carrying roads. It would increase demurrage charges from present rates to $4 per day for the first two chargeable days, $7 per day for the next two days, $10 per day after that. Move would also reduce cancelable debits from four to two days. Scrap people have already protested.

### Towards Better Stainless Grades

The 12 pct chromium stainless grades have been among the six bestsellers in popular esteem for a long time. Most significantly, their properties are still being improved. Recent tests indicate that slight increases in carbon content can appreciably boost impact strength of the low carbon grades. For more severe applications involving impact, carbon contents of 0.12 to 0.19 pct are now recommended.

### Lift Trucks: Farm Use Growing

Slow ripening, but definitely shaping up. That's how at least one industrial truck maker views agriculture's potential as an increasingly important market for mechanized handling equipment. Incentives: pared handling, spoilage costs, reduced spread between producer, consumer prices. Many orchard, vegetable, packing operations already use trucks; other areas show interest.

### Selenium Gets DMEA Hand

Anticipated mobilization needs for selenium far outstrip current supply. So says Defense Minerals Exploration Administration, which has just added selenium to the list of 33 minerals now eligible for financial assistance in exploration projects. Major uses for selenium are in power rectifiers, some military items.

# good start

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**RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL**
Processed to meet special gauge tolerances and provide special finishes and physical properties . . . solves many fabrication, cost and performance problems.

In figuring production costs, a metal fabricator has the right to depend on good performance with the product of the strip steel supplier of his choice. To insure the performance needed to provide the best end-product cost, it sometimes pays to buy restricted specification cold rolled strip steel. Although the initial cost might be somewhat greater per ton of steel, many examples can be cited to illustrate the economy in such a practice when end-product costs are facts and not estimates.

Consider the case of the West Coast manufacturer who was purchasing coil stock (sold as cold rolled strip steel) for a forming operation where close gauge tolerance was not of greatest importance. (However, the drawing quality, because of chemistry, was not uniform and die costs and rejects were causing expensive down time and yield losses.) Switching to a **CMP** restricted specification strip, the manufacturer obtained a uniformity in coil after coil that eliminated these problems and provided an end product cost much below his former cost even though his initial steel costs were higher.

For a better finish, both on the product and on the cost records, it will pay you to check your requirements with **CMP.**

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**CMP STRIP PROVIDES**
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# better finish

# Steel Labor: Storm Signals Are Up

**Union rejection of Big Three offer moves negotiations into "make or break" stage . . . Divide and conquer tactics seen in return to individual company negotiations . . . Five-year pact spurned—*By Tom Campbell.***

◆ THE STEEL INDUSTRY has put forward its best wage foot. The union has stepped on it. Both sides have lost their calm and cozy attitude. The battle lines are being quietly drawn this week. Barring a miracle, it looks as if the fight will go down to the wire on June 30.

The steel industry offered a five year contract with an impressive package. In a drive to create stability that would check inflation and normalize expansion costs, the industry via the Big Three (U. S. Steel, Bethlehem, Republic) called for an iron clad non-reopenable agreement costing 65¢ an hour for the five year period.

*(For the time being, at least, the Big Three "experiment" has been shunted to the sidelines and marked "hold." In a weekend development, David J. McDonald, steel union president, said he was reverting to individual negotiations with 11 steel companies as indicated in* THE IRON AGE, *June 7, 1956, p. 71.*

*(Some observers see in this latest move a hint that Messrs. McDonald and Arthur Goldberg, his general counsel, may be courting the idea of "divide and conquer" by posing the threat of shutting down part of the industry and letting the other steel firms continue operating.)*

The union is skittery about taking on a five year package. It labels the whole deal a "picayune" wage offer with fringe—too little, too late, and too long. This prompt rejection—forecast by THE IRON AGE—was accomplished in a surprise press conference called by Mr. McDonald last Friday. It was surprising in that the Big Three were notified that it was coming about two hours before the meeting took place.

### Good Timing

The agreement had been that press conferences would be joint affairs. Industry people have been burnt this way for many years. It was surprising that they were not more aware of the probability of such a "quick" press meeting with its chance to give the union side first; unencumbered with facts the industry gave out later in the day —too late to make the same news editions.

The wage costs of the steel offer in this first year would be 9.83¢ per hour (including the allotted increased costs of vacations, unemployment payments, overtime, pensions, social security and holidays). These are accounting increases that occur each time there are changes in straight hourly wage rates.

On a straight hourly wage rate basis the offer was a wage in-

## Why Steel Labor Talks Hit Snag

| Union Demanded This: | Big Three Offered This: |
|---|---|
| ■ "Substantial" wage boost. | ■ Average increase of 7.3¢ an hr. |
| ■ 52-week supplemental unemployment plan costing 5¢ an hr. | ■ SUB plan costing 5¢ with some qualifying provisions. |
| ■ Weekend pay premium of time and a half for Saturday, double time for Sunday. | ■ Premium for Sunday work equal to night shift premium starting July 1, 1959. |
| ■ Shift premium boost to 5 pct of base for second shift, 10 pct for third shift. | ■ 1¢ boost in shift premiums starting July 1, 1958; a 1¢ and 2¢ boost starting July 1, 1960. |
| ■ Reporting pay increase from 4 to 8 hours. | ■ No response. |
| ■ One week vacation for 1 year, 2 weeks for 2 years, 3 weeks for 3 years and 4 weeks for 15 years. | ■ 1 to 1½ weeks for 3 to 5 years, 2½ weeks for 10 to 15 years. |
| ■ Two more paid holidays. | ■ One more holiday starting July 1, 1957. |
| ■ Improved pension plan. | ■ Improved pension plan. |
| ■ Improved social insurance with employers footing entire bill. | ■ Additional 1½¢ an hr contribution for more benefits, with employees contributing like amount. |

The companies' five-year contract would cost approximately 65¢ over the period, with 17⅔¢ additional cost being shouldered this year.

crease of 7.3¢ per hour on the average. Labor classification No. 1 was merged with No. 2 so that the low man on the totem pole this year would get a 12¢ an hour raise. The highest rate classification would get a 12¢ an hour raise in each of the next five years covered in the contract.

### Claims and Counterclaims

The total cost to the steel industry of the package in the first year would be 17.67¢ an hour. Reduced to straight time it amounts to around 15¢ an hour. By a flight of statistical imagination the union managed to reduce the wage package to about 5¢ an hour in take home pay. It dismissed the fringe benefits as something that would not buy groceries. The union wants a lot more than the 7.3¢ straight time average hourly increase offered by steel.

While the union made a fuss about the absence of a cost of living clause, the steel industry is willing to give in on this point. Both sides will bargain on the formula to be used. If they agree, it will be a big departure on the union's part. For 20 years the steelworkers have turned down the inclusion of a cost of living gimmick in its contract with steel.

The management side, in expressing surprise at the prompt rejection of the package which represents months of work, insisted that the five year time element was "final" and so was the total cost. That meant there would be tough jockeying around over the next week and a half. This was the first time that the steel people have been so intent, so arbitrary and so final in a press conference about what they would not do.

### Strike Possible

If the steel firms stand pat on their refusal to change the 5-year time element or change the total package cost, there will be a strike. They agreed to bargain within the framework of five years and 65¢ total cost. If taken at face value such a statement means bargaining is a futile gesture.

Likewise the union's burst of no confidence in the offer was an arbitrary and inflexible stand. If taken at its face value, it means no more bargaining except concessions on steel's part.

In putting its "best foot" forward steel people had taken a long chance that their offer would get dignified attention, that the union would assume that this year leadership on both sides is imperative and that if there is a strike the union could be held responsible. It may have been a long, long chance. Steel officials have little room to go between the 15¢ (17.67¢ to them) that has been offered in the first year and the "about 20¢" that has been mentioned repeatedly in these dispatches.

### A 5-Year Challenge

The union is up against it, too. To agree with a five year no strike contract is something entirely foreign to a David McDonald brought up on the hard bargaining of John L. Lewis and the late Phil Murray. If Mr. McDonald agrees to this deal, even at a higher figure, he will be taking a challenging step.

Steelworkers are noted for wanting the "green stuff" more than the so-called fringe. They like to receive the fringe but their idea has always been on cold hard cash. The steel negotiators may not have taken this into enough consideration. But that could be Mr. McDonald's waterloo and is the main reason why the steel meetings are now getting extra sensitive. Some fringe may be thrown out in favor of more "money."

If Dave McDonald blows a gasket in the final run down, there will be trouble. But the odds this year seem to favor him acting like a labor statesman. He has everything to gain in the labor high hierarchy if he settles this steel fracas without a strike, with a stabilizing contract and with a "good" wage increase. But being "high in labor's hierarchy" alone is not what will keep Dave in the top steelworkers' union position.

Walter Reuther has a contract coming up in two years. If Dave McDonald agrees to a contract that will look sour to what the auto workers eventually drag out of the auto people, his goose will not be cooked but it won't hang so high.

### Highest Paid

The steel negotiators have been quite mindful of all this Reuther shadow. That's why they sweetened up the wage package with all the fringe trimmings. The wage increase is really the result of using a 2½ to 3 pct yearly productivity formula on the present average wage.

It is unique that steel leaders are willing to take a 65¢ an hour gamble which ties them down for five years regardless of how the economy ends up by that time. That is something for the "books." But even more important is the fact that steelworkers will be about the highest paid in industry after the present fracas is over.

Incentives too would be based on the new rates so they would go up proportionately to the base rate and increment changes.

## What A Steel Shutdown Can Do

◆ A STRIKE of 264 railroaders closed the Tennessee Coal & Iron Div., U. S. Steel Corp., seven weeks ago. Here's what the shutdown has meant to labor and metalworking dependent on the big plant:

A minimum of 40,000 workers in basic steel and metalworking idle. Pay loss to steel workers is around $15 million.

Steel loss of 600,000 tons has forced Bessemer plant of Pullman-Standard to lay off 1100 workers, plan complete shutdown by July 1; Decatur shipyard of Ingalls Shipbuilding to close two weeks ago, layoff of 800 at Pascagoula shipyard; layoff of 100 at Ingalls' Iron Works. Other companies have cut operations to minimum. Some are buying premium price steel from northern mills.

# TINPLATE: Are Can Companies Revolting?

**Resentment against possible price increases is apparent . . . Can makers also step up blackplate use . . . American could switch 70 pct of output to "tinless" cans . . . Increase research—By *K. W. Bennett.***

◆ PRESIDENT William C. Stolk, American Can Co., has announced that 70 pct of his company's output could be switched to "tinless cans" (chemically treated blackplate) in the event of a sudden national emergency.

Behind the statement is growing can company opposition to increases in the cost of tinplate, historic raw material for the manufacture of "tin" cans. American Can produced 1.5 billion cans per month in 1955, purchases $400 million worth of blackplate, tinplate and other steels.

Estimated total industry output for 1955 is figured at 39.1 billion containers, for purposes of comparison. U. S. canners use, through their purchases of tinplate, 30-40 pct of the nation's annual tin consumption.

### Not Fooling

Said Mr. Stolk, "On March 8, 1956, when the steel industry announced that it was raising the price of tin and steel plate . . . we issued a statement vigorously opposing the new rates . . . We did not make the statement to hear ourselves talk . . . We are installing extensive ($27,000,000 worth) new equipment and operations at various points in the United States to process tin plate and steel plate from continuous strips. This to a major extent will eliminate the use of precut sheets which we, like the rest of the industry, have been using up to now."

### Blackplate Moves In

This would reduce extra charges for inspection, chemical treating, and cutting of the tinplate. It would still spell substantial sales for tinplate, even if in a coil rather than a cut sheet.

The darker cloud on the horizon for tinplate is the accelerating drive for a blackplate can. Blackplate cans made from cold-rolled steel sheets chemically treated by the canners themselves, already package dog food, motor oil, antifreeze, waxes, polishes, insecticides, cosmetics, drugs, coffee, lard and detergents.

It is estimated that at least 5,260,000 lb of tin consumption could be eliminated each year, and tin on the "tin" cans still used could be cut to a whisper (.085 oz per can). Beer is scheduled for introduction in the same type can. The effect would be to put at least 10 billion cans, or one quarter of total can output, into the blackplate can category. Another item coming for the tinless can is liquid shortening.

Continental, National, and American, among the big can producers, as well as others, are already in the blackplate can picture. American has $27 million committed for construction of new plants or renovation of old plants which will either use tinplate in coils or chemically treated blackplate.

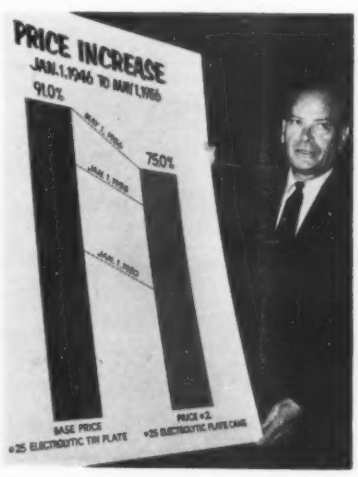
**FOR STEEL INDUSTRY REACTION SEE PAGE 164**

The plants may turn out complete blackplate cans which are welded or organically sealed along the seam rather than soldered.

### More Research

Continental Can, with 80 plus plants, is opening a $7 million Metals Research Laboratory at Chicago. American Can did the same a year ago. One of the main objectives is wider application of the tinless can, though this has not been spelled out in a direct statement.

## Can Company Executive Objects




◆ TINPLATE price increases, causing can companies to seriously consider tinless models, are shown on graph by William C. Stolk, president of American Can Co.

Recent developments include: 1. The flat statement that we could presently put 70 pct of a major producers output in tinless cans. 2. Development of higher speed equipment for manufacture and closure of tinless cans. 3. The tinless can is beginning to look better for high can consumption items, beer, soft drinks, even whole milk. 4. Can men seem grimly determined to reduce material costs and the tinless can could do it.

# COPPER: Ulcers Aren't In Season

**Producers not worried about inroads of aluminum into their markets . . . Metal consuming pie big enough for all . . . Per capita consumption considered key to future—By *F. J. Starin.***

◆ "THERE is hardly a copper market which aluminum has not invaded," says a representative of one of the major U. S. producers. "And in some, like high tension wire, aluminum is now the dominant factor. But the fact still remains that copper companies are selling every pound they turn out."

Copper & Brass Research Assn. has several other reasons why copper companies are not likely to lose money nor get ulcers.

John A. Coe, president of American Brass Co., member of CABRA, sees the future "requiring the production of all metals in ever increasing amounts." In other words, while the metal consuming pie is now being cut into more slices, many of the slices are larger than the entire pie was a short time ago.

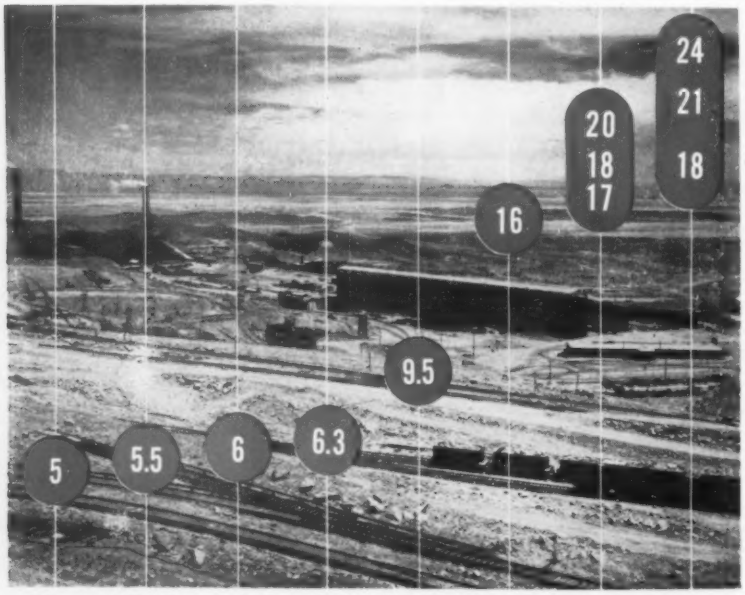
Behind this theory is the record of per capita copper consumption in the U. S. Since the turn of the century it has been on a steady uptrend, without even a suggestion of a valley.

R. L. Prain, chairman of the Rhodesian Selection Trust Group, asserts that under today's market conditions his group could show some profit if price of copper were as low as 30¢ per lb. A fair price, according to Mr. Prain, would be 35¢ per lb.

On the long term outlook CABRA is optimistic, expects metals to settle into markets based on (1) inherent suitability, and (2) economic situation. Copper lost many "fringe" markets in 1955 due to unavailability as well as price. But at present, horizons look bright.

## Copper's Key To The Future

Per Capita U. S. consumption, in lbs




### Hedging

Though they see good times ahead, a number of copper companies are playing it safe.

Partial boxscore currently looks something like this: Anaconda—$65 million invested in primary aluminum plant; subsidiary American Brass Co.—$25 million for integrated aluminum mill. Kennecott—$18.8 million invested in 13.1 pct of outstanding Kaiser Aluminum common stock. Cerro de Pasco—purchased Fairmount Aluminum Co., one of the nation's largest independent, nonintegrated producers of aluminum sheet, coil and circles.

Rome Cable Corp., Rome, N. Y., now has rolling facilities to handle both copper and aluminum. At least six members of CABRA handle aluminum.

### Big Investments

As proof that they are not whistling in the dark, copper producers point out that they are backing their views with cash.

Most of the investments made in 1955, totaling hundreds of millions of dollars, will not begin paying off until 1958.

Aluminum producers are enthusiastic about inroads they expect to make in the future. But I. W. Wilson, president of Aluminum Co. of America, admits that, "The aluminum industry is not going to make the copper industry passe. There are going to be enough expanding markets."

# CLAD METALS: Out Of The Frying Pan

**Used largely for kitchenware before, new applications for this structural medium are discovered by fabricators . . . Stainless steel, plate, nickel and copper most popular materials—By G. J. McManus.**

◆ CLAD METALS are rapidly moving out of the bargain basement. Current applications find clad being used in growing quantities, not to save money, but to get the distinct traits of two metals in a single piece.

A good example of the trend is provided by kitchenware, which takes over 90 pct of the stainless clad strip produced. The stainless surfaces provide a bright, easily cleaned finish for pots and pans. An inner layer of mild steel conducts heat throughout the cooking area, prevents the hot spots that would develop with solid stainless.

### Copper Valuable

Copper has been widely used in cooking utensils for its heat conducting properties. It is now branching out into new cladding fields. The Joseph Kinney Co., Carnegie, Pa., which makes copper clad sheet, reports considerable interest among jet engine people in the material. The jet men have been checking copper clad steel for use in combustion liners, rocket motor throats and other spots requiring rapid dispersal of heat.

Copper clad material is also being used in heavy electrical apparatus, where the strength of steel and conducting qualities of the copper are both needed. The wave guides of a high frequency television transmitter station offer a good example of combined qualities. Copper cladding material carries the transmission impulses but the steel backing gives the guide unit the same expansion rate as the steel transmitting tower and eliminates the need for special mounting.

### Plate Advantageous

Price of copper clad sheet (one side) is about the same per pound as pure copper but because of a favorable strength-weight ratio, the clad material may offer a saving by reducing the amount of material needed.

In the heavier gage materials, cash and material savings are still a big factor in clad metal sales. Plate producers figure that clad stainless nets the user a 25-50 pct saving over solid stainless.

### Vessel Construction

However, clad plate also offers performance advantages. Nickel, for instance, needs a steel backing for strength at temperatures over 600°F. Jessop Steel, Washington, Pa., reports that users are turning to clad steel for annealing tubes. The carbon steel backing permits faster heat transfer and speeds the annealing cycle; the stainless steel provides a stable, long lasting inner surface.

Stainless is the material used for most plate cladding. Nickel, Inconel and Monel cladding are available and in good demand, but the scarcity of these materials has limited output. Copper clad plate is also offered but fluctuations in the price of copper have made pricing a problem and discouraged customers.

Petroleum, chemical and food processing industries continue to make good use of clad steel for pressure vessels. Stainless cladding gets a big play because of its resistance to corrosion. A more recent use of clad plate is in coal hoppers.

Lukens Steel Co. salesmen carry around with them chunks of a clad steel hopper that was cut up after 9 years service and showed no measurable wear of the stainless portion. In addition to its ruggedness, stainless has the advantage in hoppers of offering a smooth surface that keeps coal moving freely and eliminates hang-ups.

Production trend in clad materials is toward bonding the metals by hot rolling rather than by casting them together. In the case of stainless, the surface to be fused is first cleaned. It is then coated with nickel or iron to prevent the formation of chromic oxide.

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## Two For The Price Of One

**Clad Metals are used to get properties of two distinct metals in one piece. In kitchenware, stainless provides bright finish, mild steel layer gives, heat conducting qualities.**

**In electrical equipment, copper cladding gives strength of steel, conducting quality of copper.**

**In coal hoppers, stainless clad steel plate offers ruggedness plus a smooth surface that keeps coal moving.**

**In tubing, carbon steel clad with nickel permits faster heat transfer in annealing cycle, and a stable inner surface.**

**In atomic energy, reactors are going to stainless clad steel for added strength and corrosion resistance.**

# PLASTICS: Look For Their Biggest Year

**Sales of over $2 billion foreseen in '56 . . . Industry's equipment makers are concerned about mounting order backlogs . . . Reinforced plastics offer growing competition to metals themselves—By G. G. Carr.**

◆ IF YOU CAN'T yet buy an all-plastic baby-sitter, it's probably just an oversight that will soon be remedied by an industry aggressively determined to keep the consumer surrounded with plastics from swaddles to shrouds.

That's the sum of corridor talk heard at the seventh National Plastics Conference and Exposition in New York. The exposition opened in New York's brand-new Coliseum to a cheery chorus of cash registers as the plastics industry prepared to ring up its best year to date in both production and sales.

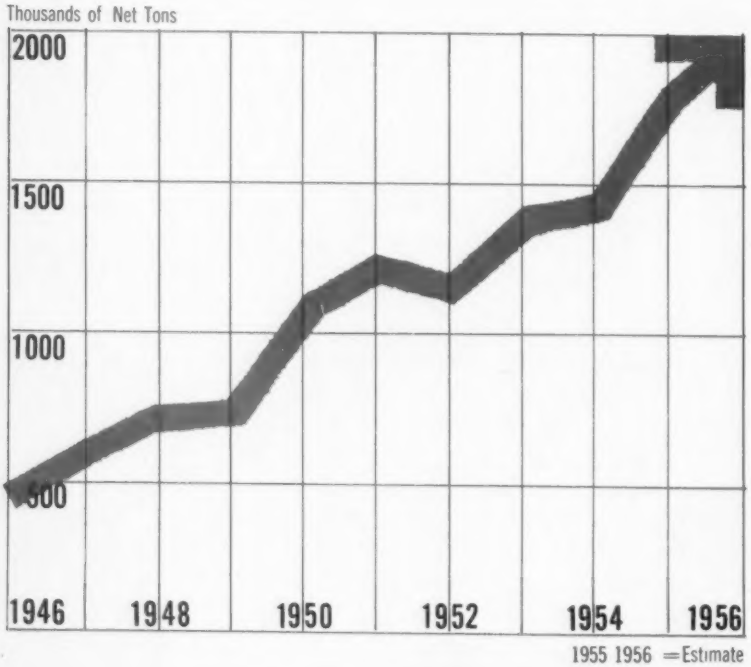
### Over $2 Billion

Gross sales for the plastics industry this year will pass the $2 billion mark, with plastics production over 4 billion lb, predicts Norman Anderson, president of General Molded Products and of the society of the plastics industry.

And nobody in the industry will give him much of an argument. "If everyone has sales like mine this week," one exhibitor commented, "We'll beat the predictions in a walk."

Orders are not limited to plastics and plastics products. Watson-Stillman Press Div. of Farrel-Birmingham Co., reports its order backlog for a new and popular injection molding machine is now 7 months. The company hoped to trim this to 3 months by the end of the year, but is now not so sure, in view of new order volume.

## Upward Climb of Plastics Production




A spokesman for Lester-Phoenix, Cleveland molding machine maker, says, "We've never seen business like this." Other machinery makers are worried that their lengthening delivery dates will lose business to competitors, so anxious are customers for equipment.

In plastics themselves, the industry has continued to bust out all over. Last year's record output of 3.6 billion lb of raw materials was 30 pct over the 2,827,803,000 lb in 1954. Growth has included both thermoplastic and thermosetting materials, and covers the steadily expanding use of such standbys as the ureas and the phenolics as well as the recent hyperthyroid development of polyethylene and the polyesters.

Most spectacular growth has been in polyethylene. Output in '54 was 50 pct above '53, and in '55 it again zoomed up 50 pct to a total of 420,191,117 lb. Similar growth is predicted this year, and some industry observers are talking about a 627 million lb output in 1960. Applications range from supermarket packaging through many miles of lightweight flexible pipe and tubing. And new polyethylene formulas are continually expanding its potential. One important development in this field—low pressure extruded polyethylene sheet was unveiled by Campco Div., Chicago Molded Products Co. at the show.

### Future In Metalworking

Versatile vinyls continue to find new worlds to conquer, ranging from rigid pipe to upholstery fabrics. Vinyl resins for molding alone last year hit an 85 million lb peak, 26 pct over 1954, and this year should be even better.

Epoxy resins seem set for a strong future in metalworking, particularly as tools and dies for

sheet metal forming. Industry sources put 1960 output at 82 million lb, about triple current levels. Producers also count heavily on the epoxies' future as adhesives.

Nylon molding materials continue to hold a warm place in metalworkers' hearts. Automotive and electrical industry applications, particularly for gears, gaskets, bearings, shafts and the like, are standouts. No lubrication and little maintenance are special features. Annual production of about 45 million lb is expected within the next 3 or 4 years.

Top-selling molding powder is still polystyrene, one of the older standbys. Well-known in such fields as packaging, toys, gadgets, etc., the new impact grades with improved physical and mechanical properties promise continuing expansion for this material.

### Compete With Metals

Growing competition to metals themselves is coming from reinforced plastics, with almost 49 million lb of polyester resins used by reinforced plastics fabricators last year. This was an increase of about 80 pct over the 27 million lb used in '54, with a further increase of 50 pct expected during '56. Big feature is the ease with which intricate shapes can be formed with a minimum of tooling. Truck bodies of the material are currently winning a significant place, and other applications include everything from washing machine tops and tubs to boats and children's sleds.

All in all, the plastics industry sees nothing but profitable growth ahead.

## New Alcoa Press

A 14,000 ton extrusion press, equal in size to world's largest, and costing total of $9 million, will be financed by Aluminum Corp. of America.

New unit is scheduled to be put into operation sometime in 1959 at Alcoa's Lafayette, Ind., works.

Press will be used primarily on alloy extrusions for aircraft and missiles. Specific items to be produced include ribbed wing sections, wing spars, rotor blades for helicopters. Structural shapes to 110 ft in length, weighing as much as 2500 lb, will be turned out.

MARKETING

# STEEL STRAPPING: Moving Up

**There's plenty of prosperity ahead if steel strapping sales are an indicator . . . Even so, competitors are training for a pitched sales battle next year in this market.**

◆ STEEL STRAPPING, used to package anything from zinc ingots to finished refrigerators, has been regarded as a fair barometer of business to come. If the barometer is true, there's a windfall of fresh business still ahead in 1956.

Steel strapping men report that May has been the highest month in sales this year, that June is hitting May levels or even exceeding them in scattered cases, and that the industry is averaging 17 pct ahead of total sales in the opening five months of 1956.

### No Surplus

Never anxious to look a gift horse in the mouth, steel strapping salesmen carefully point out that (1) customers may be building inventory in expectancy of a price advance in basic steel during the summer months, and (2) that a considerable portion of steel strapping output goes to mills which strap up steel shipments going to customers who are inventorying pre-price-advance steel.

But the fact remains, that there is no surplus of finished steel strapping, some distributors and producers would like to see their own inventories of the widely used packaging material built up, and that in one or two cases they can actually see more trouble in supplying their customers in late June and July than they are having at the present moment.

### Higher Output

Some have received notification that less steel would be available in the near future (largely due to summer slowdowns at mills supplying strap stock to the producers of the finished item) which is bound to affect the supply picture. Normal vacation time cutbacks by consumers of steel strapping are bound to reduce third quarter demand but will not throw the market into the second-half doldrums that have freely been forecast in some quarters.

### Sales Tools Honed

It's a rough guess that 1955 was a year that saw 400,000 tons of steel strapping fabricated and shipped to consumers. If these figures are correct, and nobody is really sure, the total for 1956 should exceed the 1955 figure by another 30,000 tons to as much as 60,000 tons.

U. S. Steel's Gerrard Steel Strapping Div. seems to be moving strongly into the market after a comparatively recent start. Some sources reckon that Acme, Signode, and Gerrard now represent about 70 pct of the total U. S. strapping market, though these would be fighting words to a number of companies producing the same product and currently enjoying booming sales levels.

In strapping, things are good. But sales forces are already dragging secret weapons out of closets for a brisk battle in 1957. A number of pieces of new strap handling equipment are scheduled for showing later this year. Included in the sales drive are: (1) lower unit cost per item packaged in steel strapping; (2) higher strapping speed independent of cost; (3) strapping machines requiring less maintenance; and (4) a stiff sales drive in a number of new markets.

To sell strapping in 1956 you have to sell also the machines that can tighten and tie strap around a package. Signode, for example, completed a brand new plant in 1955 near Chicago for manufacture of "strapping machines, tools, and seals."

Senate Committee Recommends:

# Let's Get Defense Tooling Program Off The Ground

**SENATE SMALL BUSINESS committee takes top defense officials to task for inertia in following up Vance Committee recommendations for mobilizing reserve of machine tools . . . Makes recommendations to achieve goal of machine tool readiness for defense emergency . . . Report follows inquiry into status of program . . . Military and machine tool builders testified at hearings.**

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◆ **WHERE MACHINE tools are concerned, it's questionable whether the U. S. is now in a better position to face a defense emergency than it was in 1941 or 1950. Doubt is expressed in a Senate small business committee report blasting top military and defense mobilization officials. It says that despite the machine tool shortage lessons taught by World War II and the Korean emergency, a "wait-and-see" attitude still characterizes all phases of government machine tool policies.**

**After blistering the "brass" thoroughly, the report recommends:**

1. That the Dept. of Defense move ahead with its announced policy for instituting and maintaining an annual machine-tool replacement program.
2. That responsible officials of the Dept. of Defense direct particular attention to the budgetary aspects of machine-tool programming.
3. That machine-tool budgets of each service be forwarded to the Secretary of Defense and totaled into a single item so that officials of the Dept. of Defense, the Office of Defense Mobilization and the Congress may have a convenient reference for determining their adequacy.
4. That Defense officials should give renewed consideration to the Vance Committee recommendations calling for a mobilization reserve of machine tools and related production equipment.
5. That the Dept. of Defense should program for special machine-tool programs, e. g., elephant tools, turbine gear, etc., in addition to modernization programs and procurement of general purpose tools for the reserve.
6. That the Dept. of Defense and each military department should push to completion the machine-tool inventory program.
7. That the Government should review its leasing policy with the view of establishing a fair rental rate and diminishing the number of government-owned machine tools supplied to private industry where feasible. In particular, the Government should exercise care to make certain that the competitive position of small concerns is not adversely affected by the leasing of government-owned tools.

◆ **REPORT stems from Washington hearings conducted four months ago. Hearings were called shortly after the Dept. of Defense announced a freeze on machine tool purchases for emergency reserves, and said it wanted to buy tools for current production.**

**Object was to determine the impact of this policy change, both on overall military preparedness, and also on the vital machine tool industry. Senators quizzed top officials in the Defense Dept., Office of Defense Mobilization and the three military services, also heard testimony from representatives of the National Machine Tool Builders' Assn. and the American Machine Tool Distributors' Assn.**

**Report does a thorough job of summarizing the background leading up to the recent hearings, follows with observations and recommendations on the current machine tool situation.**

**Here are excerpts from the official report:**

### *Vance Committee Did Good Job—*

" . . . In 1952, . . . the Office of Defense Mobilization appointed an Advisory Committee on Production Equipment to explore machine-tool problems and recommend governmental policy. This Committee, under the chairmanship of Harold S. Vance, came to be known as the Vance Committee.

"The Vance Committee urged a new approach to the

problem of production equipment, proposing that the policy of the government, in preparing for a mobilization period, be to substitute to the greatest extent practicable, production equipment for the stockpiling of military end items. To achieve this objective, the Committee recommended:

(1) That machine tools be procured in advance and held in reserve to support the mobilization base program.

(2) That the government institute an annual machine-tool replacement program to keep the government inventory in an up-to-date condition.

(3) That recognition of the machine-tool industry as a vital cog in national defense means the industry should be maintained at a vigorous level of productivity."

### What Happened?—

" . . . To inaugurate the mobilization reserve program, the Congress appropriated, upon the urgent request of the Dept. of Defense, $250 million for fiscal year 1954. Fiscal year 1954 ended before any of the $250 million was obligated and these funds were allowed to lapse.

"The list of essential long-lead-time machine tools was further pruned by the Dept. of Defense until only $100 million was requested for fiscal year 1955. This amount, and a like figure for fiscal year 1956, were appropriated by the Congress.

"In November of 1955, the Secretary of Defense stopped all obligations of funds appropriated by Congress for the procurement of long-lead-time tools in support of the mobilization base. Some $84 million of fiscal year 1955 funds not obligated prior to the freeze were ordered returned to the Treasury. Your Committee is informed that fiscal year 1956 funds are also being withheld.

"If the Vance concept had been implemented, obligations for mobilization reserves alone in the three-year period since the Vance Report (Fiscal years 1954, 1955 and 1956) would have totaled from $600 to $1,500 million. Your Committee is shocked to find that less than $16 million has been obligated . . . for the creation of a mobilization reserve of machine tools."

### Why the Policy Change?—

" . . . Government witnesses . . . testified that the revised machine tool policy resulted in a considerable degree from a revision of war plans to meet the strategic needs of today.

"Your Committee notes a certain contradiction . . . as to whether the essential concept of the Vance plan for creating a mobilization machine tool reserve is to be retained. On the one hand government witnesses testified that the revised program is in accord with the Vance concept. On the other, their testimony was based heavily on requirements for current use tools.

"Viewed in the light of their history of disinterest, testimony . . . suggests either a lack of candor in explaining the reasons behind the revised policy or is indicative that key Dept. of Defense officials have not faced up to the policy problems inherent in a comprehensive, clearly-defined machine tool program."

### Vance Plan Still Sound—

" . . . Your Committee is not disposed to make a determination about the nature of future defense emergencies or to guess whether these demands will entail a big or little war. In the absence of clear testimony, however, and in the face of the admitted doubts of responsible officials, your Committee is inclined to agree with [Navy] Secretary Fogler that it is from an insurance standpoint, very unsafe to assume and make *all* the preparations on its being a short war.

"Therefore, your Committee must support as still sound the Vance Committee's recommendations calling for advance procurement of machine tools in the support of a mobilization plan. This does not negate urgent requirements for special tools to meet current production schedules nor does it lessen the urgency of modernizing the government inventory with resulting economies. This is not a question of either/or but of both."

### Keep Pool Orders Up to Date—

". . . As one means to assure speedy machine tool production in a future emergency, the Government has developed an M-Day pool-order program to be automatically 'triggered' in any future emergency. Contract forms for these pool orders are nearly ready and much progress has been made on drawing up lists of machine tools to be covered under the pool-order program.

"Your Committee recalls that after World War II the National Security Resources Board prepared similar 'phantom orders.' They were worthless during Korea, however, since the list of tools to be ordered had not been constantly re-evaluated and brought up to date. Hence the pool-order program will require constant surveillance if it is to prove more meaningful than the Korean phantom orders."

### Urge Inventory Speedup

". . . Your Committee agrees that much has been accomplished in determining the extent of the government machine tool asset. Nonetheless, this task has moved slowly. No undercurrent of dissent or service rivalry should be permitted to stem the completion of this task. Despite the gains to date, information as to make, model, electrical characteristics, age, condition, location, etc., for many of the government-owned tools is far from complete.

"That greater knowledge as to the extent of the government holdings is required is attested by the fact that estimates of total holdings has dropped 20 pct since the task of inventorying began. It seems obvious that responsible defense officials should be aware of the extent of machine tool holdings."

### Suggest Better Leasing Policy

". . . A sizable number of government-owned machine tools are presently leased to private industry. Decisions on what machines are to be furnished defense contractors and whether by lease or as a part of the facilities program are left to individual contracting officers. Consequently there is little uniformity of leasing policy. A possibility of discrimination between competing contractors exists.

"Another problem connected with leasing is to establish a fair and reasonable rental rate. Testimony before your Committee indicated that government rentals are distinctly below commercial rates. The Defense Dept. took cognizance of this in January, 1955, and issued a revised directive covering machine tool rentals allowing rates up to 2% per month of acquisition value for those machine tools less than 5 years of age.

"However, industry witnesses informed your Committee that the escape clauses of the directive have been so widely used that most leases continue at the rate of 1% monthly. Your Committee feels that the government low-rental policy grants unfair advantage to those favored. In particular, it tends to place small concerns at a competitive disadvantage.

"Further, your Committee believes that the leasing of government-owned machines at bargain rates tends to

continue less efficient tools in production. To the extent that this is so, our defense-production capacity is diminished and our machine tool industry correspondingly curtailed.

### *Are There Enough Elephant Tools?—*

". . . Testimony . . . brought out the fact that elephant tools are an exception to the rule that a list of military end-item requirements is the prerequisite of machine tool programming. Because of the unusually long lead-time required for their design and manufacture it is essential that a sufficient volume of elephant tools be on hand prior to any knowledge as to specific end-item use.

"This necessity is compounded by the fact that many components of elephant machines must be built on other such machines, thus accelerating any shortage which may occur.

"Taking note that different conclusions have been reached on [a] government survey, your Committee recommends a re-evaluation of this study to reconcile the conflicting opinions of industry experts and government officials. This study should encompass not only isolated deficiencies but the major premises on which the government conclusions were based.

"In view of the extreme long lead-time involved in elephant tools, every effort should be made to reach creditable determination as to the volume of these machines needed for reserve."

### *"Usual Delay" on Turbine Program*

". . . Another tooling problem requiring special attention is the so-called turbine and turbine gear program. Purpose . . . is to provide a reserve of those specialized machines required for the manufacturer of propulsive units of modern ships. After a careful study, the ODM approved $70 million to provide a reserve of these vital tools.

"The usual period of delay followed; the Bureau of the Budget held up the program while an interagency study group again reviewed the list of tools and equipment.

"Your Committee can report that this program has now been approved in reduced amount. Except under unique circumstances such as those involved in the production of elephant tools, no responsible person would urge the expenditure of funds for machine tools unrelated to end-item requirements.

"Nonetheless, the delays in this program are illustrative of the difficulty that the ODM has encountered in making its determinations effective. Your Committee has noted a general reluctance to commit funds for machine tools though the uncertainties in this area would not seem substantially greater than in others. If greater determination is not shown, the next emergency may have come and passed without the vital decisions having been made."

### *The Committee Concludes—*

". . . In answer to the central question whether the nation is now in a better position regarding machine tools for another defense emergency than it was in 1941 and 1950—the Committee cannot give an unequivocal answer. Nowhere has there been a machine tool policy boldly conceived and forcefully executed. Rather, there has been a faltering and grudging reluctance in carrying out provisions of the landmark Vance Report.

"[The] Committee must note that the machine tool inventory has received no significant input since Korea. Furthermore, no systematic machine tool program can be instituted prior to fiscal year 1958. Your Committee hopes, however, that some funds can be gleaned from fiscal year 1956 and 1957 budgets to inaugurate a machine tool procurement program. Otherwise, another full year will slip by without improvement of the national machine tool asset."

Modernization is Urgent . . . Your Committee notes with satisfaction that the Dept. of Defense has adopted the concept of a machine tool modernization program since the hearings of Feb. 8 and 9. It is essential that an annual replacement program, realistic in scope, be instituted without further delay. The continued operation of obsolete tools is wasteful of public funds. An improved capacity for meeting future defense production demands provides an additional bonus for a modernization program.

Don't Delay on Elephant Tools . . . Your Committee is perplexed at the evidence that the Vance Committee recommendations for the creation of a mobilization reserve of machine tools has, and is, being given scant attention. It seems evident that the production demands on the machine tool industry in a future emergency—whether it be a major war or another Korea—will be heavy indeed. It seems equally clear that a partial answer to this strategic dilemma is to implement Vance Committee recommendations for the advance procurement of long-lead-time tools in support of a mobilization base program."

ODM on the Spot . . . Congress must continue to look to the Director of ODM for leadership in developing broad machine tool policies despite the lack of major accomplishment in recent years.

"Dr. Flemming assured your Committee that he would look to the Dept. of Defense to implement his policies in this vital area and that he will maintain an active interest in seeing that results are accomplished. Although he gave no concrete program for doing this task more effectively than in the past, your Committee notes that this responsibility cannot be evaded."

Defense Dept. Must Push . . . Your Committee also feels that officials within the Office of the Secretary of Defense have a continuing responsibility to see that vigorous machine tool programs are instituted by the military departments. These officials have the further duty of seeing that budget barriers are overcome and that each military department accords adequate budget priority to its machine tool program."

Keep Machine Tool Industry Strong . . . Your Committee also deems it essential that mobilization plans be further refined and perfected so that all possible barriers to the expansion of the machine tool industry which can be anticipated in advance be removed.

"This recommendation is made not in the spirit of favoring the machine tool industry but in recognition of the fact that machine tools are the first order of priority in expanding defense production.

"Your Committee further concludes that a healthy machine tool industry is of itself a defense asset of highest order which must be considered in determining the government machine tool policy."

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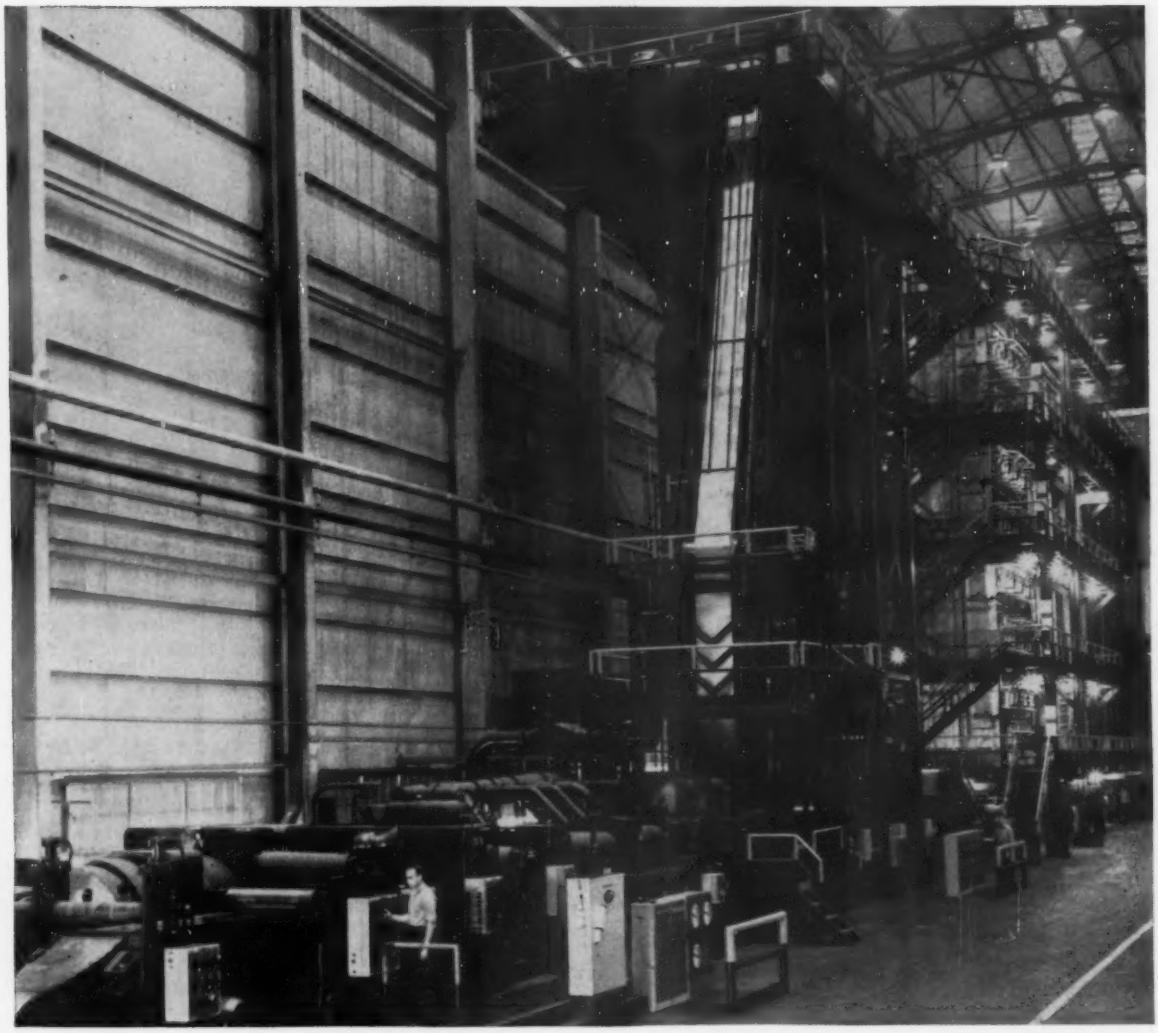
# B.F.Goodrich



# Rubber stretches a mile of steel

*A typical example of B. F. Goodrich improvement in rubber*

THAT'S a mile-long strip of steel on its way to becoming tin cans. To toughen steel, they run it through that continuous annealing line at speeds up to 900 feet per minute. It does in 20 minutes what used to take two days. But for a while it looked like one of those good ideas that just wouldn't work.

The trouble was with the rubber-covered rolls that keep the long strip moving. After just a few hours, the rubber was worn smooth and shiny with rubbing plus high speed. Then the rolls couldn't grip, the steel smeared and couldn't be used for cans.

B. F. Goodrich engineers worked on the problem, and came up with a new rubber compound that helped make this process really practical. Rolls covered with the special rubber don't slip, don't glaze, don't mar the finish of the steel. And, in the mill shown here, B. F. Goodrich Strip-Grip rolls are lasting 10 times longer than the rolls used before.

Finding a way to improve steel mill rolls is an example of the B. F. Goodrich method of approaching a customer's problem. We have been able to solve equally difficult ones, just as successfully, in p roducts you undoubtedly use. Your B. F. Goodrich distributor would like to tell you what these improvements are, and how they can be employed for your profit. *B. F. Goodrich Industrial Products Company, Dept. M-649, Akron 18, Ohio.*

**B.F.Goodrich**

**INDUSTRIAL PRODUCTS**

# EXPANSION IN INDUSTRY

## Pipe Expansion

Wheeling Steel Corp. will spend $3.5 million to improve and modernize its Benwood, W. Va., works.

Major part of the money will be spent on pipe finishing and warehouse facilities.

Pipe finishing, both black and galvanized, will be consolidated in existing warehouse building. A new warehouse with overhead cranes will be built. Major railroad track changes will be made in line with shifting activities.

At Benwood, slabs from Steubenville South Works are reduced into skelp for continuous weld pipe production.

## Honduras Copper

New Fortune, a Canadian mining company, has acquired claims to total of 6000 acres in Republic of Honduras, from which it expects to take unusually high metal content copper ore.

Area is divided into two sections. Most extensively explored is Batan, with average ore grade about 3 pct.

Santa Inez is now being drilled, with initial estimate of the ore quality about 4 pct. Midway between the two a third copper showing has been discovered. Called Zopilote, little work has yet been done in this tract. Trench samples indicate ore contains about 1.99 pct copper.

Company claims liberal attitude of the government, combined with good quality of ore, makes this site potentially an excellent and lucrative source of copper for world markets.

## SHIPS:

### Bethlehem subsidiary will spend $10 million by 1957

Bethlehem Pacific Coast Steel Corp.'s shipbuilding division will invest $10 million in expansion and improvement by 1957. Principal feature of the Bethlehem Steel Corp. subsidiary's plan is the installation of a floating commercial drydock.

Estimated to cost about $8 million, the dock will have a lifting capacity of 35,000 tons, length of 850 ft, width between walls of 125 ft. Size is adequate so installation will be able to handle the large modern oil tankers now being built or on the drawing boards.

Dry dock will be built by the shipbuilding division itself.

Other features of the project include replacement of piers, and development of larger, more diversified marine machine shop.

LIKE cracking walnuts with a sledge hammer, equipment grinds and hones miniature bearing ring blanks, largest of which has 3/8 in. O.D., in Miniature Precision Bearings, Inc., new 50,000 sq ft plant, Keene, N. H.

## Expansion Briefs

**Aluminum Co. of America**; purchased site in Edison Township, N. J., for construction of $1.5 million die casting plant; will replace Garwood, N. J., works.

**Stauffer Chemical Co.**, New York; purchased 50 pct interest in San Francisco Chemical Co., from parent, Mountain Copper Co., Ltd., London, Engl.; purchased plant had been Stauffer's chief supplier of phosphate rock.

**Gas Appliance Service, Inc.**, Chicago; manufacturers of industrial heat processing equipment; new plant, in Chicago area.

**Mineral Exploration Corp., Ltd.**, Montreal, Can.; plans to erect new 150-ton capacity custom zinc smelter in Australia.

**Vento Steel Products Co.**, Buffalo; steel window manufacturer; plans construction of new building in Buffalo suburb; cost between $250,000 and $500,000.

# TWO GREAT NAMES

**Teamed For Quality...Service...Progress**

Two steelmakers, each known for its achievements in its own particular field of producing forged and annular rolled products are now combined to supply requirements of the largest and smallest. Two groups of production and research engineers are joined to better serve American industry. The new company is a totally owned subsidiary of Heppenstall and will operate independently. Each company will continue to offer American industry the custom made products for which it is famous.

## MIDVALE - HEPPENSTALL CO.

NICETOWN
PHILADELPHIA 40, PA.

A SUBSIDIARY OF HEPPENSTALL COMPANY

# Straightens tubes of standard wall thicknesses, in all grades, from 4½" to 16½"

## ...40 TIMKEN® bearings carry the load!

WHEN the Sutton Engineering Company built their new No. 5 M KTC tube straightener, they knew it had to give many years of rugged service despite heavy loads and constant use. So they mounted the two driven rolls, five idler rolls, speed reducer and table rolls on Timken® tapered roller bearings.

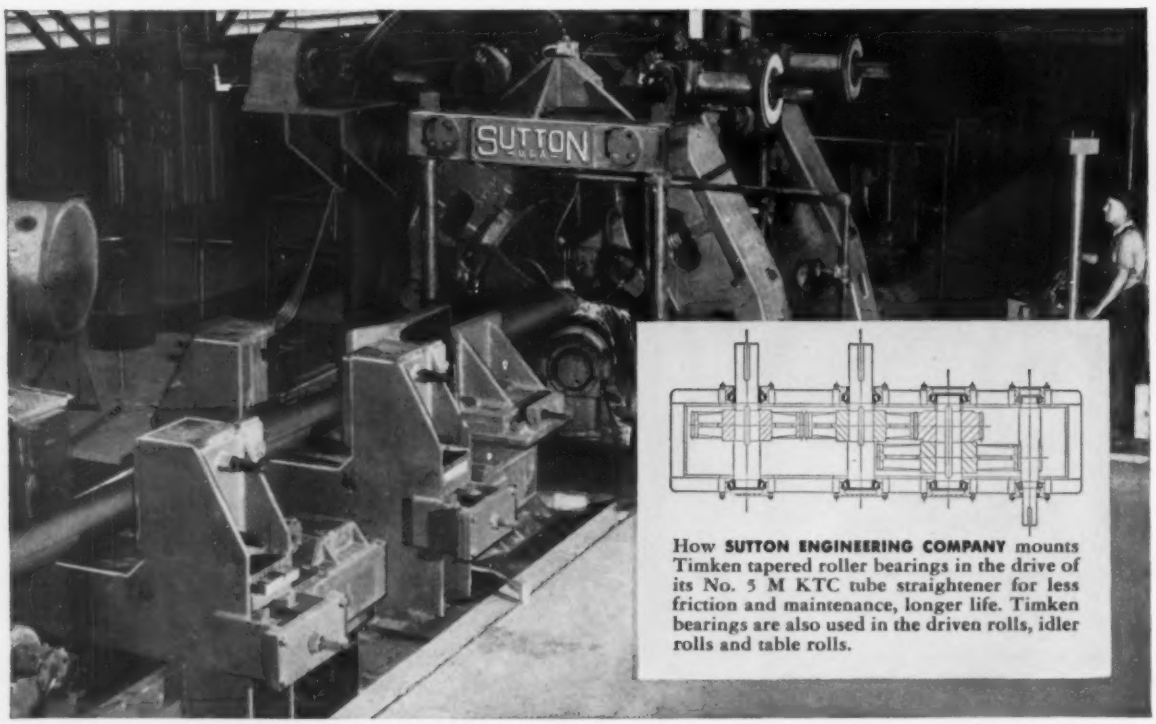
Timken bearings on the rolls easily handle the heavy radial and thrust loads as tubes up to 16½" pass through. That's because Timken bearings are tapered—take radial and thrust loads in any combination. No thrust bearings are required. And full line contact between rollers and races gives them extra load-carrying capacity. Timken bearings keep shafts in accurate alignment, assure smooth operation.

The compactness of Timken bearings permits a high load-carrying capacity in a relatively small-size bearing. Valuable space is saved.

Wear is held to a minimum because Timken bearings practically eliminate friction. They're designed by geometrical law to have true rolling motion. They're made with microscopic accuracy to conform to their design. And they're made of steel we make ourselves. We're the only bearing maker in the country who takes this extra step to insure quality.

To get all these advantages, always specify Timken bearings in the equipment you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*






How **SUTTON ENGINEERING COMPANY** mounts Timken tapered roller bearings in the drive of its No. 5 M KTC tube straightener for less friction and maintenance, longer life. Timken bearings are also used in the driven rolls, idler rolls and table rolls.

### IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

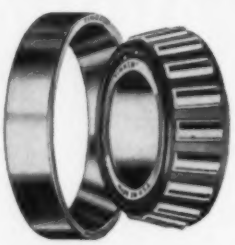
$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

**TAPERED ROLLER BEARINGS**



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ✳

# REPORT TO MANAGEMENT



### How's Your Negotiating Score?

While it's too early to establish the pattern of labor settlements this year, chances are that most negotiations will follow somewhat the formula established in 1955.

**Pressure will be for more** in the way of fringes as well as pay increases. Fringes in some ways are taking precedence as the trend toward employment security continues in most industries.

**One reason that the pattern** won't vary too much is that a number of long-term contracts were negotiated in 1955. Precedent is that few large segments of labor will make gains much in excess of those established in those industries, although there is a lot of pressure to equal or better them.

**Another factor is good business** that has prevailed in most industries for more than a year. This also makes negotiations tougher. Unions have an extended period of prosperity and profits for industry to point to —regardless of their own prosperity in the same period.

### The 1955 Settlement Pattern

An analysis of wage agreements in 1955, completed by Bureau of Labor Statistics, Dept. of Labor, shows that 95 pct of all manufacturing settlements resulted in wage raises. Forty-eight pct of the workers involved in the contracts received raises of 5¢-9¢ per hour. Twenty-two pct received from 9¢ to 13¢, with 19 pct receiving more than 13¢.

**Two-thirds of manufacturing** companies that negotiated pay raises also established or liberalized what the Labor Dept. calls supplementary benefits, or fringes.

**While the survey doesn't go** into specific amounts, 41 pct liberalized health and welfare benefits, 28 pct holidays, 29 pct vacations, 25 pct pensions. Other benefits liberalized or established include shift differentials, premium rates and sick leave. Eight pct of all settlements resulted in supplemental unemployment benefits.

**This doesn't guarantee the same** pattern will be followed. Probably the settlement of the steel industry and the USWA this year will establish the pattern for 1956. (See P. 59 for more on steel labor.)

### 1956 Profit Outlook

Based on first quarter returns, profits of most metalworking and manufacturing companies will decline somewhat in 1956. This is indicated in first quarter reports of the large corporations regularly represented in the Federal Reserve Bulletin.

**Durable goods industries show** a decline in profits after taxes from $888 million, last quarter, 1955, to $787 million for the first quarter of this year. This represents reports from 106 large companies.

**Primary metals declined less** in comparison. Same period shows a drop from $350 million to $343 million for the 39 reporting companies. The 27 machinery manufacturers represented show declines from $124 million to $75 million for profits in the same interval. Automobiles and equipment profits slumped from $346 million to $312 million for 15 companies represented.

### Are You Getting TV Eyes?

Although you may have heard a lot about TV sales declines (waiting for color), the TV industry is still in top shape. In the past 12 months, June to June, 7,350,000 TV sets were sold, compared with 7,870,000 the previous year.

**Meanwhile, color TV sales will** raise the dollar value of sales above the $1.12 billion set the previous year.

# INDUSTRIAL BRIEFS

**Research In Cans** . . . Continental Can Co., has officially opened its $7 million new Research and Development Center in Chicago. Nearly 600 people, 265 are scientists and engineers, will work at the new center, which is considered to be the largest and most advanced under one roof in the can-making industry. The center will service the company's 41 plants in the Metal Div.

**Land Ho!** . . . Ground has been broken at the Electric Boat Div. of General Dynamics Corp., Groton, Conn., for a new building to provide more space for the Design Dept. Cost will be approximately a a half million dollars. It will be erected by Turner Construction Co., of New York and Boston.

**That's Progress** . . . Trane Co., La Crosse, Wis., has announced new building projects which will include: A 5040 sq ft addition to the Trane Research and Testing Lab., a new 45,000 sq ft warehouse building and a 4800 sq ft paint storage building, all in addition to record construction activity already in progress this year.

**Move It Over** . . . The award of a $2,958,529 contract to D. W. Winkelman, Inc., of Syracuse, N. Y., for highway and railroad relocation in the vicinity of Massena, N. Y., has been announced by the administrator of the St. Lawrence Seaway Development Corp.

**Winner Takes All** . . . A contract has been awarded to The Fluor Corp., Ltd., Los Angeles, Calif., an engineering and construction firm, to design, engineer, and construct a delayed coking and calcining unit of approximately 10,000 barrels per day capacity for Lake Charles Chemical Corp. The total project will cost approximately $6,250,000.

**It's Not Us** . . . Vickers, Inc., does *not* own the plant mentioned as the site of a series of national industrial expositions next October. The plant, formerly operated by Vickers, is now the Detroit Artillery Armory, 15000 Eight Mile Road, Oak Park, Mich., a unit of the Michigan National Guard.

**To The Mount** . . . Morgan Aluminum Welding Rod Co., manufacturer of aluminum and magnesium welding rods and electrodes, is moving its entire production operation from Cleveland, O., to Mt. Carmel, Pa.

**Original Lima** . . . The Lima Electric Motor Co., Lima, O., announces the opening of a new branch office in Detroit to handle original equipment, Lima electric motor, and Lima gearshift drive sales in the area.

**Uncle Tom's Dream** . . . A complete line of all-steel, prefabricated buildings has been introduced by Atlantic Steel Co., Atlanta, Ga. To be manufactured and sold under the trade name, "Dixisteel," the buildings are engineered to individual requirements for maximum use.

"About that shipment of pig iron you ordered—I think there's been a slight error!"

**Five of a Kind** . . . Canadian steel manufacturer has ordered a fifth Mead-Morrison Bridge to handle iron ore at its plant in Hamilton, Ontario. The bridge, designed and engineered by the Mead-Morrison Div. of McKiernan-Terry Corp., Harrison, N. J., will be built by the Canadian Mead-Morrison Div. of U. S. Steel Corp. Ltd., Welland, Ontario.

**Hold That Cost** . . . American Assn. of Cost Engineers was organized on June 2 at a meeting on the campus of University of New Hampshire, Durham, N. H. President of the new group is Norman G. Bach, supervisor of engineering services for Monsanto at Texas City, Tex. Primary objective of the AACE will be "to advance the science and art of cost engineering in or related to the process industries."

**Up Landing Gear** . . . Construction is underway for the new expansion project at Montebello, Calif., for the Axelson Mfg. Co., Div. of U. S. Industries, Inc. Increased facilities for manufacturing aircraft landing gear and components will be housed in the new building and will consolidate all Axelson aircraft manufacturing activities.

**Three-In-One** . . . Consolidated Electrodynamics Corp. has completed a $1.5 million research, engineering, and marketing building in Pasadena, Calif.

**Cobalt Am Main** . . . One of Western Europe's first and largest atomic radiation sources has been installed at Frankfurt am Main, Germany. It is being housed in Battelle Institute's laboratory and consists of 1500 curies of cobalt-60 radioactive isotope, which has a radiation potential equivalent to 15 million dollars worth of radium.

# How Great Lakes Steel *molds* quality

As molten pig iron gushes from the world's largest blast furnace, a generous cupful is ladled out into small, trough-like molds.

Cooled and solidified, these "guinea pigs" (samples of the iron that goes into open-hearth steelmaking) are then rushed to Great Lakes quality control laboratories. For they hold a big chunk of the secret to producing steel that meets customer specifications *all down the line!*

They tell if the blast furnace burden is precisely balanced. They tell if as many impurities as possible have been eliminated. They help tell just what "seasoning" must be added to the open hearth charge, so every batch of steel has the desired chemical composition and drawing qualities—and no buts about it!

Quality control *every* step of the way! That's our job at Great Lakes Steel . . . that, and the kind of service you expect—*and get*—from just one phone call.

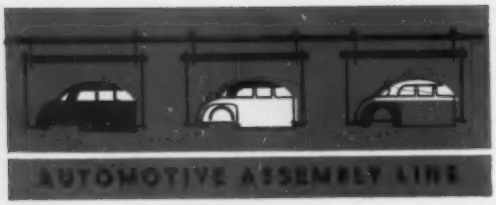
**GREAT LAKES STEEL CORPORATION**

Ecorse, Detroit 29, Mich. • A Unit of

NATIONAL STEEL CORPORATION

LARGEST IN THE WORLD and first with a hearth diameter of over 30 feet, the No. 1 Blast Furnace is one of four at Great Lakes. Thanks to constant control, these furnaces produce iron that, beyond question, spells higher quality steel.

*District Sales Offices:* Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.




# Sales Climb With Temperature

**Car buyers shed coats and umbrellas, reach into pockets after a cold spring . . . Huge inventory dented at last . . . Plants have enough steel in stock to finish out 1956 model run—By T. L. Carry.**

◆ THE AUTO industry finally sold some cars in May. Estimates for the month, tabulated by Ward's Automotive Reports, show that at least 75,000 cars were chopped off the record high new car inventories.

It marks the first time in several months that the industry has been able to even make a dent in stocks which have been hovering close to the 900,000 mark since last February.

None of the sales managers in Detroit are completely enthusiastic about sales in May, but they are cautiously optimistic regarding how much further they will be able to reduce stocks during the summer months.

**Here's why** . . . Actually, sales did not begin to pick up noticeably until the last 10 days in May. On an average day to day basis, there weren't as many cars sold in May as there were in April. So, the reduction in new car stocks reflects more the heavy cutbacks in production than any sudden spurt in sales.

Ward's estimates that some 530,000 cars were sold in May compared to an industry production of approximately 472,000 units. Predictions right now, although cautious, are that it is possible that during the month of June new car stocks will again be reduced by another 100,000 units.

**Summer Pickup** . . . Although no figures are as yet available, it is estimated that sales for the first 10 days of June for some volume producers were better than they were for the like period in May.

Thus, the qualified opinion here is that production will still be kept low but could increase slightly if sales continue to get better.

The predictions are based on the hope that warm weather is finally here to stay and, although the spring selling rush never really materialized, some sort of a selling spurt, no matter how slight, is long overdue.

**Steel Is Plentiful** . . . It is still estimated that there will be approximately 200,000 to 350,000 cars on hand when the industry introduces its new models.

In the meantime, the present picture in the auto industry doesn't look too bright for steelmakers. It is no secret that steel inventories for various producers run anywhere from 35 to 45 days. On this basis, there will be plenty of steel around to finish out the 1956 model run regardless of the outcome of the steel labor negotiations.

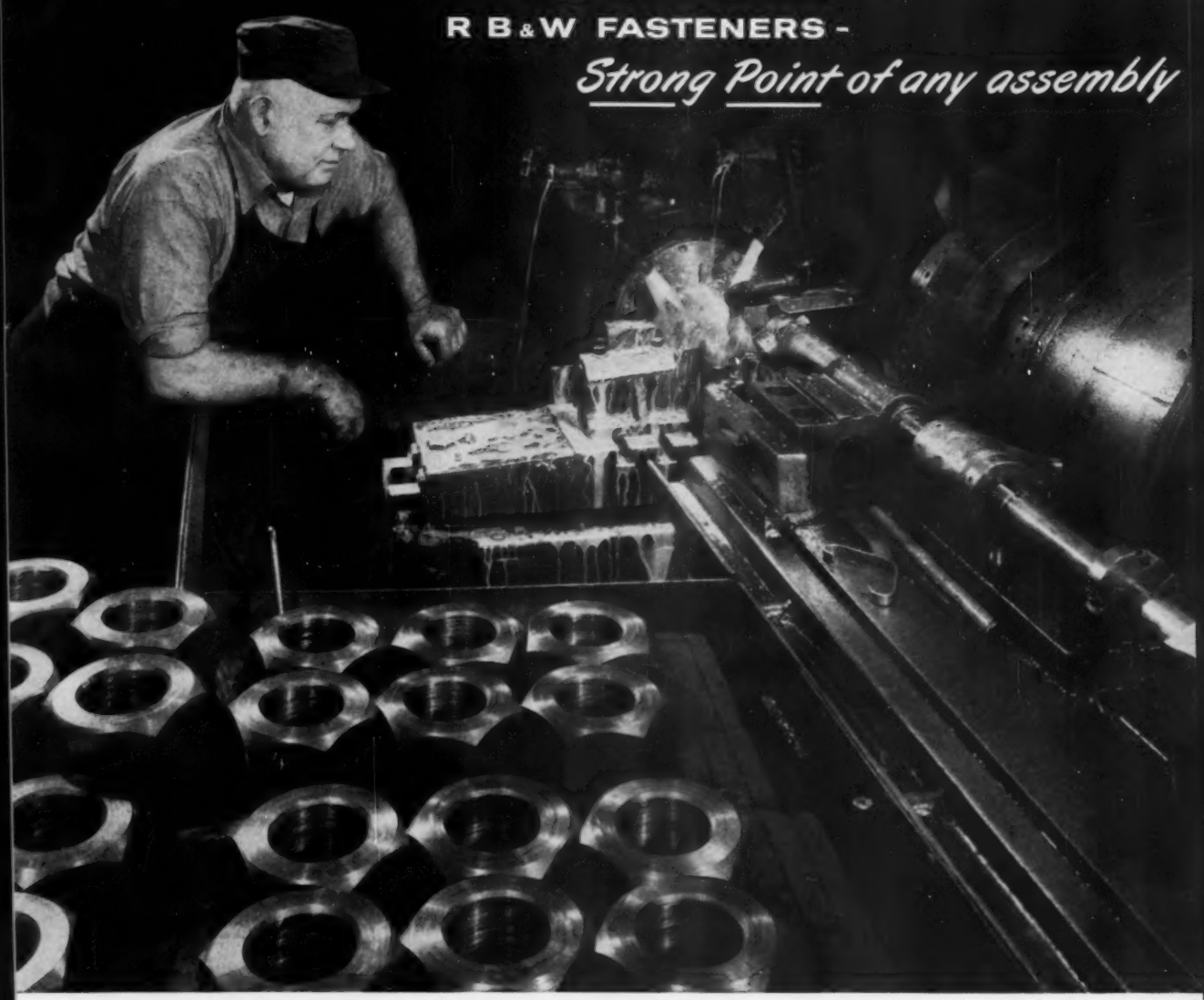
At the same time, some producers have already started to place orders for 1957 steel and as the summer wears on these are likely to increase appreciably.

From where we sit, it still looks like the 4th quarter this year is going to be a good one.

BUICK EQUIPPED with retractable trolley wheels is one of 13 used by the Chicago, Burlington and Quincy Railroad for inspecting branch lines. The dual purpose car eliminates doubling back over same rail route.

## Belt Line Challenge

The trend toward more visibility above the belt line of a car offers a tremendous potential market to plastics manufacturers, according to Harry E. Chesebrough, executive engineer in




# Going to extremes to satisfy every need in fasteners

WHAT's the size-limit on nuts? Pretty high at RB&W, as you can see from the 4" giants above. At the other extreme, RB&W produces nuts down to ⅛". Everything in between, too.

Most are made on automatic nut formers. Big stuff gets milled from hex bars, and needs more personal attention. Frank Culko, long on skill and precision, is shown keeping his expert eye on the operation. Like so many other RB&W craftsmen, he's been with the company for well over 20 years.

There's plenty of production skill and experience, plenty of facilities behind the avalanche of nuts flowing from RB&W. In fact, it was RB&W that developed the first cold-punched-nut machine, the first continuous automatic nut tapper, and pioneered the cold forming process. Also a fact: RB&W recently invested millions of dollars in bolt and nut making equipment to expand capacity.

RB&W goes all out on quality control, too... with a program recognized as the finest of its kind.

What does all this mean to *you?* More quality for your money. A truly reliable source of supply. Strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y.

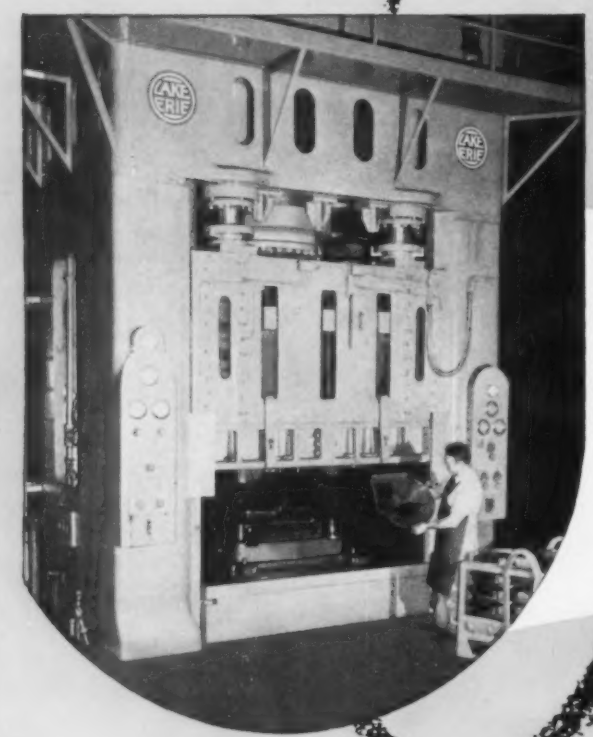
R B&W

110th year

**Plants at:** Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.

# REPEAT ORDERS TELL THE STORY

*of Customer Satisfaction with Lake Erie*




**One of the many** different types and sizes of Lake Erie presses serving Caterpillar Tractor Co. is this 2,000 ton double action, side housing design with cushion. This press has a 42" draw stroke, 24" clamp stroke, 96" x 96" bed, closing and return speed of 430"/min., and pressing speed of 23"/min.

## CATERPILLAR TRACTOR CO.

*has re-ordered Lake Erie presses more than* **20 TIMES**

Caterpillar Tractor Co. placed its first order for a hydraulic press in 1947. Today, some of the most important production operations in Caterpillar's plants are performed on Lake Erie presses. These operations include drawing, blanking, hot forming, bending, bulldozing and others. Like Caterpillar Tractor Co., many other of the great names in American industry use Lake Erie presses for a multiplicity of production jobs.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

**LAKE ERIE ENGINEERING CORP.**

*General Offices and Plant: 368 Woodward Ave., Buffalo 17, N Y*
*District Offices in New York, Chicago, Detroit, Pittsburgh*
*Representatives in other U. S. Cities and Foreign Countries*

LAKE ERIE® • **Manufacturers of die casting machines and the most complete line of hydraulic presses for all industry.**

**Automotive Production**

*(U. S. and Canada Combined)*

| WEEK ENDING | CARS | TRUCKS |
|---|---|---|
| JUNE 16, 1956 | 111,918 | 24,076 |
| JUNE 9, 1956 | 115,363 | 23,892 |
| JUNE 18, 1955 | 150,326 | 28,114 |
| JUNE 11, 1955 | 145,316 | 27,478 |

*Estimated. Source: *Ward's Reports*

charge of product planning for Chrysler Corp.

Other factors in favor of plastics, according to Mr. Chesebrough, are the use of parts that do not require service or replacement and the continuing effort to reduce car weight.

Better power-to-weight ratios are a constant objective of car designers and plastics could best serve their purpose in this field.

But the cost of fabricating plastic is much higher than it is for steel and it will probably be a long time before any kind of synthetic material will replace steel on a large scale.

At the same time, if lighter cars are desired, it would be better at this point to consider light metals that have a strength comparable to steel.

Mr. Chesebrough hints at the possibility that steel companies are not unaware of the auto industry's interest in plastics and are conducting experiments aimed at meeting the eventual challenge from the plastics producers.

Mr. Chesebrough also says that more and more parts in future automobiles will be designed to last the life of the car. The trend toward more visibility above the belt line will call for a material with considerable structural strength, resistance to climatic conditions and adaptability to complex shapes.

## More 4-Wheel Drive

Four-wheel drive is now available as a factory-installed option on the full line of trucks being produced at the GMC Truck and Coach Div.

Putting the drive on light truck models opens up many advantages to contractors,

It is interesting to note the evolution of the 4-wheel drive. When first introduced just prior to World War II, it was available mostly for vehicles being built for the government.

It wasn't because trucking companies couldn't put it on regular civilian vehicles but it simply cost too much.

Since 1946, the system has been vastly improved and better production methods have reduced the cost where today it is even available on light pickup trucks.

At the same time, adoption of the system to all types of trucks carries even further the trucking companies' efforts to create vehicles that will operate equally as well both on and off the highway.

More and more versatility is the main objective of truck producers today especially with the huge road building programs that will be going on in this country for the next decade.

## Monroney Bill Protest

As expected, the whole automobile industry is opposed to the pending legislation in Washington regarding factory relations with dealers.

**AUTOMOTIVE NEWS**

Ford, Chrysler and General Motors are all against the Monroney bill.

It is claimed that the clause in the Monroney bill forcing manufacturers to buy back cars that dealers do not want would lead to higher prices for the actual number of cars sold to the public. The effect of the bill would be to lower production, forcing the manufacturer to increase costs to make up for a decrease in volume.

At the same time, there would be a number of people thrown out of work not only in the automobile plants but in the thousands of supplier plants that serve the industry.

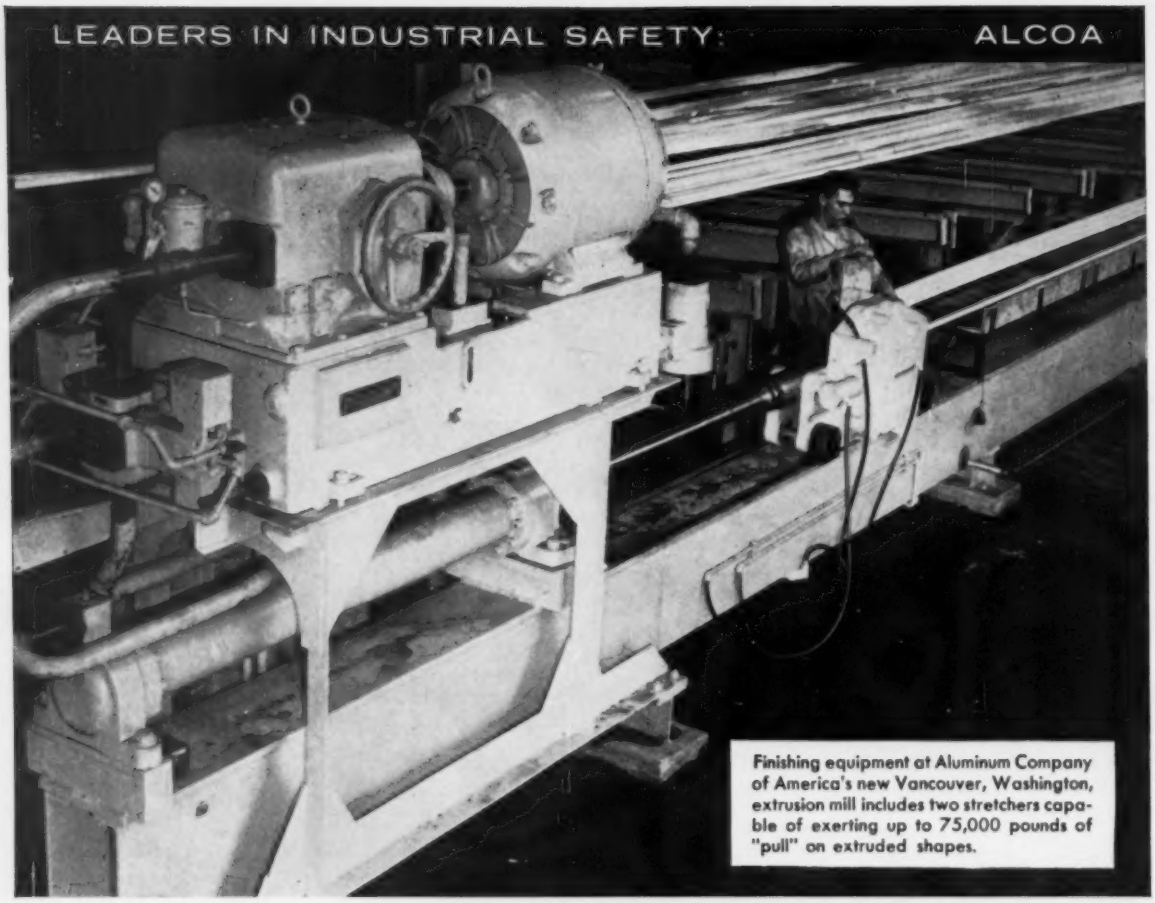
Ford Motor Co. says the result of the Monroney bill would be nothing less than "planned scarcity" which, although it might be welcomed by some dealers, would not serve the interests of the general public.

At any rate, it is still doubtful that the bill will be passed at this session of Congress.

**THE BULL OF THE WOODS** By J. R. Williams

WAIT--I'LL BE WITH YOU AFTER I PUT THIS CHAIR BACK INTO TH' BACK ROOM--I JUST HAD AN INTERESTING VISITOR!
I THINK TH' BULL OF TH' WOODS PLANTED THAT EXTRA CHAIR JUST TO GIVE THAT DRAFTIN' OFFICE BOSS A JOLT IN THEIR KIDDIN' FEUD!
NO, THERE WAS A GAL FROM TH' BUSINESS OFFICE DOWN-- I DON'T THINK TH' BULL REALIZES IT'S A JOLT, BUT IT'LL SURE SET THE OTHER GUY WORKIN' ON A DANDY FER HIM!
6-21 J.R.WILLIAMS
THE STANDING ROOM
© 1956 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.

LEADERS IN INDUSTRIAL SAFETY: ALCOA



Finishing equipment at Aluminum Company of America's new Vancouver, Washington, extrusion mill includes two stretchers capable of exerting up to 75,000 pounds of "pull" on extruded shapes.

One of the things that impresses visitors to Alcoa is the strong emphasis on safety. It isn't surprising, then, to find fire-resistant Pydraul used in Alcoa hydraulic equipment...eliminating a potential source of fire.

## FIRE-RESISTANT PYDRAUL F-9 CHANGES FIRE ZONES TO SAFETY ZONES

275 million hours of actual in-use operation—without a single hydraulic fire—*proves* the safety and dependability of fire-resistant Pydraul hydraulic fluid.

But Pydraul gives you more than safety. You can be sure of long equipment life with low maintenance . . . because Pydraul lubricates like a premium petroleum oil. You'll save money on fluid consumption, too! Pydraul is reclaimable—you can return spillage to the system, use it again and again.

Make a quick check of your hydraulic equipment . . . calculate your fire risk if it's close to hot metal, electrical contacts, open flame or other heat sources. Then talk to a Monsanto representative. He will show you how easy it is to convert to Pydraul . . . giving you a future of positive safety from hydraulic fires . . . at low cost per year.

**PYDRAUL MEANS:**

Fire Resistance
Excellent Lubricity
High Stability
No Corrosion
Re-use, Again and Again

Write now for new booklet, "PYDRAUL F-9." Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. PYD-1, St. Louis, 1, Mo.

**PYDRAUL F-9**—First and Only Hydraulic Fluid Listed by Underwriters' Lab.

On May 31, 1955, Pydraul F-9 became the first fire-resistant hydraulic fluid listed by Underwriters' Laboratories. From the Laboratories' Service Card: "The fire hazard of (PYDRAUL) is rated 2 to 3 in accordance with Underwriters' Laboratories, Inc.'s Standard of Classification in which Ether rates 100, Gasoline rates 90-100, Alcohol (ethyl) rates 60-70, Kerosene (100° F. flash) rates 30-40, and Paraffin oil rates 10-20." See Underwriters' Laboratories, Inc.'s guide No. 540 18, File MH6049.

*PYDRAUL: Reg: U. S. Pat. Off.*

MONSANTO

WHERE CREATIVE CHEMISTRY WORKS WONDERS FOR YOU

# Tax Aid On Way For Small Businessman?

**Any program for cutting their share will meet opposition of large corporations and scrutiny of Treasury . . . Yet SBA's tax study committee seeks way to ease burden on small firms—By G. H. Baker.**

◆ SMALL BUSINESS Administration officials are trying to work out methods of easing the tax burden on small business without lowering total government revenues. They hope to come up with a program in time for submission to Congress early next year.

But any such program is going to run headlong into trouble with the larger corporations, because they are the logical sources of revenue to make up whatever revenue is lost by aid to small firms.

**Hurdles Ahead** . . . SBA has established a special committee which will meet in the fall to investigate various suggestions for easing the tax burden on small firms so they can retain a higher percentage of earnings for desperately-needed expansion funds.

Any plan SBA proposes will have the approval of the Treasury Department before it can meet with much success. Treasury Secretary Humphrey is in accord with the basic idea of helping small business, he says, but has not endorsed any approach to the problem yet.

The problem of granting small firms some relief from federal taxes is becoming more important because of rising local and state property, business, and personal levies. Congress now has before it several bills designed to cut the tax bite on small firms but, barring a serious business letdown, they appear to have little chance this year.

**Regrading Suggested** . . . The two major plans involve either a complete regraduation of the corporate income tax structure, or a simple reversal of the present basic corporation tax of 30 pct and the surtax of 22 pct, so that a firm would in the future pay only 22 pct tax on the first $25,000 of profits, instead of the 30 pct as at present.

The loss in revenue envisaged in the last plan could be made up, its backers say, by simply making the new surtax 31 pct instead of 30 pct.

## Home Building:

### Government hopes to salvage good year

Administration and Congress are hoping to stimulate lagging home building back to the high level of last year before the November elections, but it's going to be a tough job.

The Administration, according to informed sources, is about to take steps to bolster the home construction industry. "It's no longer a matter of whether we ought to do something, but a matter of what we ought to do," this source says.

**Lower and Longer**

Albert M. Cole, head of the Housing and Home Finance Agency, says the possibilities for action include lower down payment requirements on FHA insured home mortgages, or any one of several actions to make more money available cheaper for the home building mortgage market.

Mr. Cole says he would expect only about 1.15 million new houses to be started this year if no moves are made to loosen the mortgage market. Housing starts now are

## Heat's On Racketeering

AFL-CIO officials, following some prodding from President Eisenhower, finally consented to a study of racketeering within union ranks.

Executive council of the AFL-CIO is telling its Committee on Ethical Practices to investigate corruption and violence of the acid-throwing variety.

The union leaders were told recently by Ike that they ought to investigate incidents like the recent acid attack on Victor Riesel, who has editorialized against racketeering in unions.

In the House of Representatives, Rep. Peter Frelinghuysen, R., N. J., is backing two items of anti-racketeering legislation — one to set up a congressional investigating committee on racketeering in unions, and another to set up a special White House commission of 12 members to recommend new laws against crooks and hoodlums in unions.

Prior to Ike's urging to clean house, AFL-CIO officials had denied there was any dishonesty within the ranks. By agreeing to look into the situation, they tacitly admit to at least a minimum of racketeering.

# Case Studies:
## NONDESTRUCTIVE TESTING SYSTEMS

**SPOTCHECK PINPOINTS DANGER AREAS** in heavy machinery and operating equipment. The Spotcheck dye penetrant inspection kit is excellent for testing during maintenance, or for intermittent spot testing for cracks and other surface defects. Kit contains all materials in easy-to-use pressurized spray cans plus a handy, lightweight carrying case.

Type ZA-29 Zyglo unit is widely used and accepted for detecting surface defects in aluminum magnesium, brass and titanium parts.

## How Production, Payroll and Public Relations Can Benefit from "Early-Stage" Testing

The most for the least, that's what your customers want today. To help answer these demands and still show a profit, you can increase the output and quality of production without increasing costs and facilities.

By supplying process control and by maintaining consistent quality standards, Magnaflux nondestructive testing systems provide a quick, accurate, economical production tool. They can increase output and lower your operating costs. M methods save money by keeping production at a dependable level.

M methods provide an "early-stage" test for the detection of surface defects in all magnetic and non-magnetic metals, ceramics, glass and other solid materials. "Early-stage" testing pinpoints improper procedures and corrective steps can be taken to eliminate the manufacture of defective parts. Where serious defects do occur, parts can be rejected before further effort is wasted on additional processing. When defects are minor, repairs can be made to decrease scrap losses and upgrade salvage operations.

"Early-stage" testing with M methods pays in many ways. It increases usable production output, it prevents unnecessary payroll costs on defective materials, it protects your reputation by insuring consistent quality, all of which means dollar savings to you!

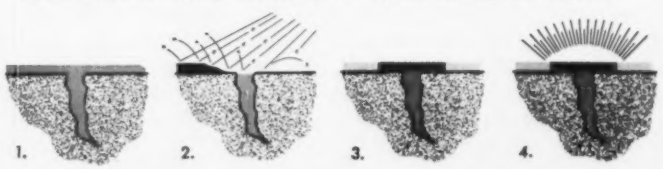
Find out how low-cost Magnaflux nondestructive test methods can help protect your company's quality, pocketbook and name. Write, or call on a Magnaflux testing systems engineer today.

**NOW YOU CAN "SEE" DEFECTS** in wires, rods and tubes of low conductivity metals such as aluminum, tungsten or uranium. The FW-200 Series unit sets up eddy-currents in the test materials. Using frequencies from 15 KC to 2 MC, any cracks, splits or seams are detected and easy-to-read indications are shown on the TV-type picture tube. Diameter changes register separately. Adjustments can be made for a visible signal and automatic rejection of defective materials.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

**Write for complete details concerning any of the above case studies, or ask for our new booklet on "Lower Manufacturing Costs."**

### HOW ZYGLO FINDS CRACKS IN NON-MAGNETIC PARTS




1. A surface film of Zyglo penetrant is applied to parts by dipping, spraying or brushing. After this application, penetrant enters any surface opening, cracks or pores, and excess penetrant is allowed to drain off. 2. Parts are then washed with a water spray, and permitted to dry. 3. Next, parts are dipped in a developing powder. This acts as a blotter, and draws the penetrant to the surface. 4. Look at the part under "black light". Any crack or surface defect will show up as a glowing fluorescent indication that is impossible to miss. Scratches will not be shown.

*Take Your Inspection Problems to the House of Answers*

**MAGNAFLUX CORPORATION**

7302 West Lawrence Avenue • Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58

running at an annual rate of about 1.1 million.

In addition, the weakness of the market — which was unexpected this late in the year—is shown by latest Federal Reserve Board figures showing that credit extended to real estate lenders is $77 million lower now than in February, and commitments to extend credit to these lenders in the future dropped by $15 million to $1.1 billion since February.

**Hope in Sight**

FHA officials believe that the curve of home construction will be up for the rest of the year and say optimistically that if credit is loosened quickly, the industry can again this year build 1.3 million new homes. But others, including the FRB, are not so sure that the lead-time in home construction planning will permit such a resurgence.

Moneywise, the home building market failed again in May to pick up much steam, rising only $58 million from April, but remaining $450 million below last year for the first five months of this year.

## Open Door Policy?

A Florida congressman proposed that all industry-government advisory meetings be conducted with open doors for a trial period of one year to find out if privacy is really needed, as the Eisenhower Administration claims.

Rep. Dante B. Fascell, D., Fla., says he has doubts as to whether the closed-door policy is necessary. He is asking the U. S. Commerce Department to open up all its industry meetings for one year to show that it means what it says about freedom of information.

**Don't Bite Hand . . .** Minutes of business advisory committee meetings are customarily kept in Commerce Department "secret" files. Even members of Congress can't look. Commerce Department says this is because the prestige and competitive positions of individual companies might be damaged if some of the remarks made by their company's representatives in Washington ever got published.

Very likely the Commerce Department will win this scrap. Commerce Department lawyers make a telling point: To publish everything that businessmen tell the government would be to shut off immediately the useful flow of trade and industry data from industry to government.

# Tariffs:

### Metal import duties cut under GATT

Increasing amounts of foreign-produced metals and metal goods will begin flowing into this country as a result of lowered tariffs negotiated recently under the General Agreement on Tariffs and Trade (GATT).

The new tariffs, which become effective June 30, cover imports worth nearly $1 billion a year. In return, 21 foreign nations gave concessions to U. S. exports running into hundreds of millions of dollars annually. Among the American export items on which foreign nations granted tariff cuts are machine tools, heavy machinery, motor vehicles, airplanes, and petroleum products.

**Last of Kind**

Concessions granted by this country to imports are limited by Congress to a maximum of 15 pct of levels prevailing on Jan. 1, 1955, and must be reached in three annual instalments of 5 pct. The U. S. tariff cuts are negotiated separately with each of the other 21 countries, and the amounts on any one item vary with the country.

The latest GATT tariff-cutting session probably represents the last of the major post-World War II lowering of duty barriers to international trade. Any further concessions granted by this country will come in small doses.

Imports of the metals and metal goods on which this country granted tariff concessions amounted to $316.3 million in 1954—the last year for which figures are available. This represents 26 pct of the total amount of dutiable imports of metals and metal goods.

## Imports Affected by New Tariff Cuts

**Many metalworking products and materials come within tariff cuts negotiated by GATT. Here are some of the products, concessions and volume of imports:**

**Iron and steel bars; concessions to Benelux, France, Germany, Italy and Sweden; 1954 imports, 409 million lb, $15.5 million.**

**Steel ingots, blooms and slabs; concessions to Canada ranging from low grades to high priced specialties; 1954 imports; 17 million lb, valued at $1 million, 1953 imports reached 267 million lb, valued at $14 million.**

**Wire rods; concessions with Sweden, Germany, France, Benelux, and Italy; 1954 imports, 80 million lb, valued at $4 million.**

**Household utensils and hollow or flat wire, chiefly of iron, steel or aluminum; concessions to Germany and Italy; imports $4 million in 1955.**

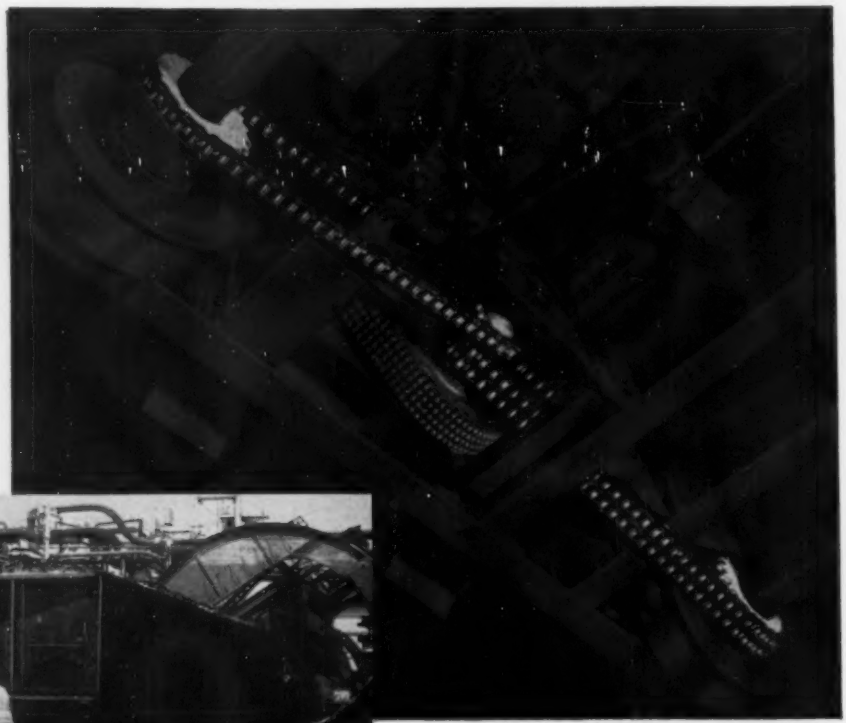
**Calculating and accounting machines and parts; concessions to United Kingdom and Italy; 1954 imports valued at $2.1 million.**

**Adding machines and parts; concessions to Canada and Germany, 1954 imports valued at $2.3 million.**

**Automobiles and parts; concessions to the United Kingdom, Canada and Germany; 1954 imports valued at $53.1 million, 1955 at $84.8 million.**

# Pint-size Whiting Trackmobile gets switch-engine power with Morse Roller Chain Drives

**Morse Chain drives take tremendous loads, punishing operating conditions right in stride**



View of Whiting Trackmobile undercarriage, showing Morse Roller Chain Drives. Employs single-, double-, and quadruple-width chain. Photo at left shows Trackmobile pushing loaded coal car to dumper. Rubber-tired wheels at ends lower to permit operation of vehicle off railroad tracks.

The Trackmobile, manufactured by the Whiting Corporation (Harvey, Illinois), does the work of a large locomotive; easily handles loads averaging 100 tons.

A major reason for the Trackmobile's rugged performance is its powerful drive system, featuring Morse Roller Chain and Sprockets. Morse quality-engineered products function perfectly under abnormal loads, and conditions such as cinders, dust, snow, ice, sand, and extremes of heat and cold.

Morse Power Transmission Products offer the utmost in efficiency, flexibility, long life, and economy of operation.

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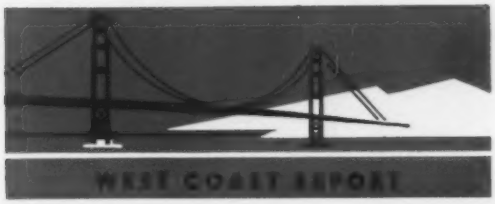


# Who's Who in Farwestern Expansion?

**All along West Coast new firms are appearing, existing ones expanding in dynamic boom . . . Roundup reveals metalmakers, fabricators and users all have important role in this growth—By *R. R. Kay.***

◆ PROOF POSITIVE that the dynamic and steady economic growth of the Farwest is more than just talk isn't hard to find.

There's a mighty strong convincer in the area's daily story of new or expanding plants. Industrial growth is really going at break-neck speed.

Here's a checklist for metalworking marketers on new or expanding Farwestern companies and what they make:

**From the North** . . . Oregon: Electric Steel Foundry, installing new radiographic equipment; Oregon Cooperage Co., barrel and drum reconditioners; Excello Co., electroplaters; Hewitt Industries, makers of diesel engine exhaust temperature indicators; Lamb Trailer Mfg. Co., boat trailers; Ben Blaisdell Saw Shop; Pacific Steel Foundry, new building for cleaning room.

**To the Middle** . . . Northern California: West Coast Wire Rope & Rigging, Inc., wire rope fabricators; Marchant Calculators, Inc., a $5 million expansion; Meat Packers Equipment Co.; Clamp-Swing Pricing Co., metal pricing systems; Fisher Research Laboratory, Inc., $700,000 instruments manufacturing plant; and Douglas Aircraft Co., Inc., big new missiles plant.

**And the South** . . . Southern California: Speed-D-Burr Corp., $250,000 plant for barrel finishing equipment; Kaiser Steel Corp., expanding its fabricating division; McCulloch Motors Corp., planning a $5 million diecasting plant, with some 75 machines; and R. H. Osbrink Mfg. Co., putting $2.5 million into a new 150,000-sq-ft plant to make cast magnesium aircraft parts.

Axelson Mfg. Co., Div. of U. S. Industries, Inc., adding 110,000-sq-ft of aircraft parts-making space; Lockheed Aircraft Corp., now planning a new 260,000-sq-ft missiles facility.

**Only the Beginning** . . . More in southern California: Square D Co., makers of electrical control equipment; Louvre Leader, Inc., stainless steel window hardware; Monarch Marking System, price marking machines; Sterling Foundry Co., non-ferrous castings; Carrier Corp., a $6 million expansion of its divisions making water heaters; Johnston Pump Co.; Duncan Rohne & Co., investment castings; Continental Can Co.; Utility Trailer Manufacturing Co., commercial truck trailers.

Sprague Engineering Corp., aircraft testing and service equipment; Consolidated Casting Co., cast aluminum and zinc plates; Boost Industries, machine shop; Industrial Zinc Products, Inc., smelting and refining; Skim-Lite, swimming pool cleaning equipment; Air Products Co., aircraft parts; Glide-Easy Electronics Co., etched circuitry; Cansco Foundry, Inc., a $250,000 expansion; and General Dynamics Corp., atomic laboratory to cost $10 million.

## Light Stacks for Heavy Ships

◆ STREAMLINED ALUMINUM smokestack, 42 ft high, is lifted into place on bridge deck of the *SS Mariposa*, Pacific luxury liner of the Matson Navigation Co. This stack, and another built for a sister ship, the *Monterey*, are formed from 17,000 lb of ¼-in. alloy aluminum plate supplied by Kaiser Aluminum & Chemical Corp. Light weight, good corrosion resistance and easy fabrication were factors in selecting aluminum for this job. Its use is saving an estimated 15 tons of superstructure weight. This reduced weight is designed to lower the vessel's center of gravity, providing greater stability and smoother sailing. The 365-passenger ships are under construction at the Willamette Iron and Steel Co. in Portland.

# Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

S.E.C.O. Heavy Duty handles all machining jobs requiring an emulsifying cutting oil. Piasecki Helicopter's large job shop at Morton, Pa., found this out three years ago when S.E.C.O. HD* replaced two expensive heavy-duty soluble oils in machining fan hubs.

Extremely versatile and moderately priced, S.E.C.O. HD has been doing an exceptional job in cutting a variety of high-alloy aircraft steels for Piasecki.

For more information about S.E.C.O. HD, see your Sun representative. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-6.

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# Streamlining Machine Tools Pays Off

**Sales glamour isn't the only advantage that results from a switch to functional design . . . Customer usually gets a product that's easier to use . . . Need for less complex machining also cuts costs—By *E. J. Egan, Jr.***

◆ TRIM, FUNCTIONAL machine tool design has obvious advantages over the "cluttered" look. It makes the salesman proud of the product and happy at any chance to show it off. It makes the prospective buyer sit up and take notice, too. Usually, it also means simpler, easier operation.

After all, the people who buy machine tools have long been conditioned to expect streamlined design in the products they buy for use at home. Result is that more and more machine tool builders are catering to this conditioned reflex.

**Conference, Conference** . . . For example, take the new hand feed precision surface grinder just introduced by Abrasive Machine Tool Co., Providence, R. I. No telling how many design and styling conferences are part of its history. But it looks as if there were quite a few. Something has to account for the fact that 45 of these machines were sold just from photographs and printed specifications before a single distributor or customer had seen an actual machine.

Of course a good looking machine won't sell unless there's something "in the works" as well. The firm's engineering group took care of this with such new items as roller bearing ways, a lifetime-lubricated motorized spindle, a handy-sized, 6 x 18 in. cable-and-drum driven table and other features.

**Borrowed Idea** . . . Best way to bundle these innovations into an attractive package was determined by borrowing a well-known auto industry technique. Several wooden "mockups" of suggested designs were built and studied carefully from all angles. A touch here and there eventually produced a design that clicked.

The grinder's appearance shows a balanced combination of straight lines, smooth tapers and rounded corners. For the customer, this means that the unit is easy to keep clean. But that's not all.

Streamlined design cuts the cost of the machine, too. How so? From the simple fact that components with flat and parallel surfaces can be located more easily and inexpensively for the machining operations they require. Costly, complex jigs and fixtures are kept to a minimum and the customer gets the benefits.

"It takes care of all rejects, automatically!"

**Last-Word Foundry** . . . Streamlining is important in other machine tool areas, also. It's probably the best one-word description for the new $7 million gray iron foundry the Bullard Co. is showing visitors to its Bridgeport, Conn., headquarters.

Finishing touches are still being put into this ultra-modern facility that gives the company 220,000 sq ft of additional manufacturing space. Two 60 in. cupolas and accompanying last-word equipment provide ample capacity for castings weighing up to 50 tons.

Need for the new foundry was dictated by two factors, according to President E. C. Bullard. One was progress in foundry metallurgy and equipment which pointed up obsolescence in the firm's old casting department. Other was the size of castings needed for the Model 75 line of bigger tools that Bullard introduced last year.

The new foundry and pattern shop has extra capacity. But it will not be wasted. The firm can use it either to serve other companies on a jobbing basis, or it can be kept in the fold if new or diversified products come into the production lineup.

**Finger-Tip Rescue** . . . Push-button defense plants will be needed to win a push-button war, according to W. Fay Aller, vice-president and research director of the Sheffield Corp., Dayton, Ohio. Mr. Aller says that, "consumer industries, already taking their first steps toward automation as a matter of competitive survival, are setting the pace and pattern for defense industries to follow."

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Gauging and controlling of steel thickness or width, hot or cold, is no longer a hand operation. It is automatic. One of our many types of precision gauges and controls is the

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This X-ray tool measures pipe wall thickness within 1% accuracy. It detects and automatically marks crop points of rolled, stretch-reduced, or extended pipe. It also indicates average wall through one or both walls. SPECTACULAR SAVINGS are achieved in major mills by elimination of wasteful blind cropping of seamless tubing, re-processing, re-inspection and re-handling. The entire mill output—from 3 to 5 lengths per minute—is checked. RANGE OF THICKNESS AND MATERIAL: .010" to 2.000" of coated and uncoated steel, stainless, brass, copper, bronze, zinc, titanium; .00025" to 10.000" of aluminum, magnesium, and non-metallics. Diameter of pipe or cylinders can be from 1" to 30".

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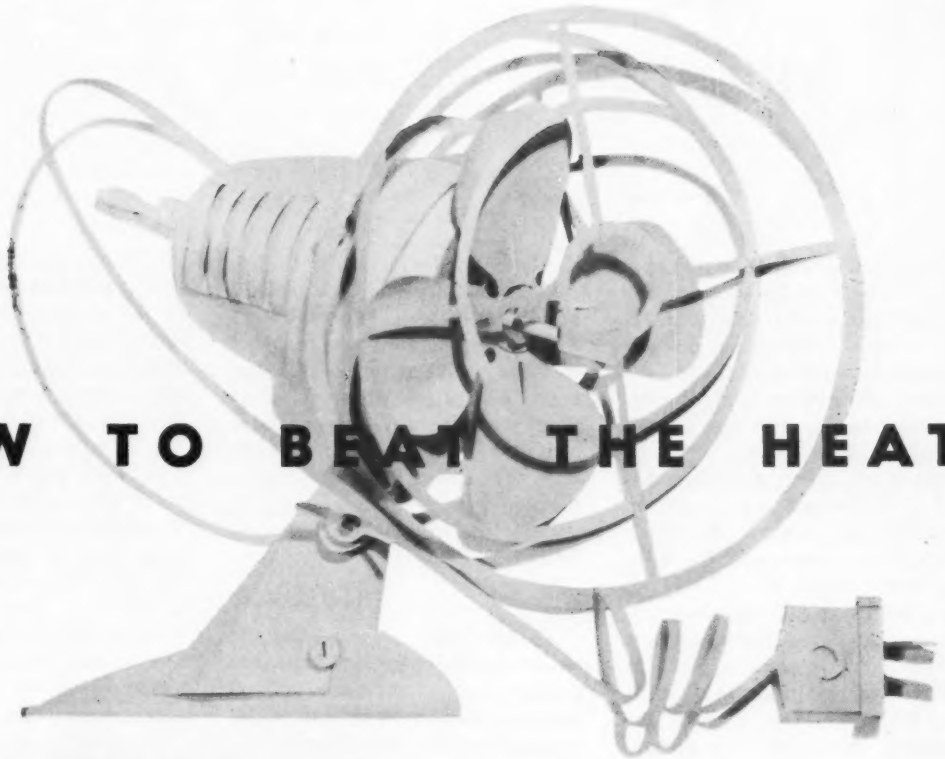
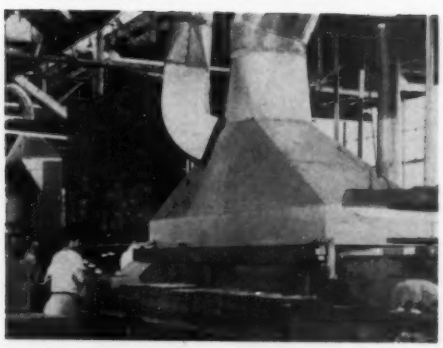


# HOW TO BEAT THE HEAT



HOT WEATHER means more to management than vacations and golf. With it come the problems of keeping office and plant efficiency high, labor grievances and worker irritation low. Metalworking, with its hot spots and heat generating processes, is extremely vulnerable when the mercury mounts.

## Behind This Report

Survey replies from more than 1000 metalworking plant managers throughout the country . . . Interviews with top authorities in the field . . . Personal studies of outstanding plant installations. Its purpose: to provide you with a broad and detailed basis for attacking your plant's hot weather problems . . . To give you another tool to improve labor relations, cut down-time, and boost efficiency.

# HOW TO BEAT THE HEAT

SURVEY REPORT TO MANAGEMENT

◆ THE PERSONNEL manager dials the weather bureau, asks for temperature and humidity readings. With resignation, he observes they are over limits of self-imposed office rules. He calls department heads with the news—work is over for the day.

Out in the plant a superintendent is confronted by a delegation of perspiring workers. It's intolerable, they chorus, and the entire department walks out.

On the other side of town, another plant keeps working all day. But efficiency is down, scrap rate is high, and plant morale is low.

In all three cases, it costs the company. It may be in lost time, low efficiency, or just the loss of employee good will. But in the hot summer months heat is a problem and it can be a costly one.

Just how serious is the hot weather problem to you? How much productive time is lost in your plant because of excessive heat? What can you do to minimize it? These are some important questions that arise each summer, often too late to really do anything about it.

### How Serious?

To help solve some of the hot weather problems, THE IRON AGE Research Div. surveyed thousands of metalworking companies and plants from coast to coast.

Results disclose that 60 pct of all plants consider hot weather a production and efficiency problem, 50 pct of these characterize it as mildly serious, 10 pct as serious.

And it's significant to note that even among those calling hot weather not serious, many of these plants have air conditioned offices, even partly air conditioned plant areas, and provide most of the ventilation and cooling devices that are used in plants that characterize hot weather as more serious.

It may be that the "not serious" conclusion is because these plants have taken the necessary measures to counteract heat effects.

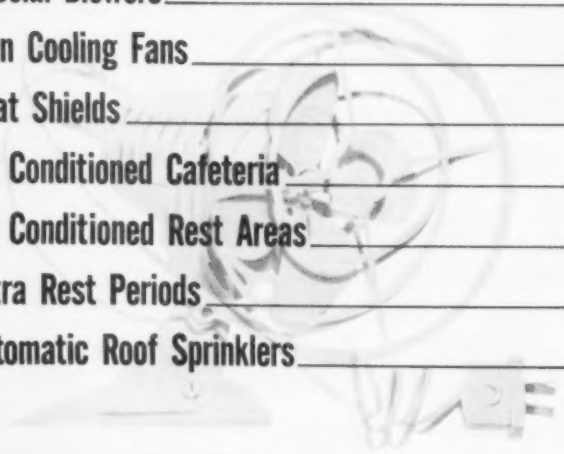
Geography has less effect than you might expect on seriousness of hot weather as a management problem. Highest percentage (13 pct) of "serious" replies stems from East North Central and West North Central areas, while South Atlantic metalworking plants show low percentage (4 pct) of "serious" replies.

But in the Mountain and Pacific Coast states hot weather presents little or no problem, to either office or production workers. Many plant officials report that measures to combat the heat instituted in recent years have cut heat shutdowns entirely or significantly. Others have air conditioned their offices and all or part of plant areas for efficiency or comfort, eliminating hot weather work stoppages.

Less easy to measure is loss of efficiency, but which most acknowledge is a serious, but incalculable factor. Absenteeism also climbs in hot weather, another factor generally acknowledged.

## How 1014 Plants Fight Heat

| | Pct. |
|---|---|
| Special Blowers | 75 |
| Man Cooling Fans | 71 |
| Heat Shields | 22 |
| Air Conditioned Cafeteria | 9 |
| Air Conditioned Rest Areas | 5 |
| Extra Rest Periods | 4 |
| Automatic Roof Sprinklers | 3 |



IA IRON AGE SURVEY

Of major importance in hot weather problems is labor relations. Over recent years, management has in many cases taken the initiative in eliminating or minimizing hot weather complications.

But whether management is progressive, backward or even indifferent, results tend to be nearly the same. With fewer and fewer examples of significantly bad working conditions remaining, organized labor has gone after heat and ventilation trouble spots with a vengeance. Alert management tries to meet demands, or get to hot spots before they become trouble spots.

A typical example of how a big industry beats the heat is Cadillac Div. of General Motors. It has a wide variety of operations from foundry to assembly and an equally wide variety of buildings.

W. D. Millington, superintendent of methods and equipment, can't risk lost time from shutdowns or isolated grievances developing into labor disputes of serious proportions. An assistant, J. A. Buser, has engineering personnel working full time on the problem.

### Full Time Problem

"Heat and ventilation make up one of our tougher problems," Mr. Buser says. "We have a plant layout engineer working full time just on this, and when we get complaints from any area, we go in and check it and fix it."

Like most divisions of large industries, Cadillac can call on company specialists in industrial hygiene as well as its own engineering staff, consequently utilizes shields, blowers, large air makeup units, exhausts, and has access to the tools and instruments necessary to solve the heat problems.

Faced with the problem, and the necessity of doing something about it, you have two individual problems, office and production. Of the two, the office is the easier to solve, if for no other reason than the alternatives are simple: air condition or not.

And in most cases, the answer is to air condition. With some definite geographic exceptions, the trend is already more than half completed.

THE IRON AGE Survey shows that in 62 pct of all metalworking plants the offices are at least partly air conditioned—with the trend to full office air conditioning.

Only in those fortunate Mountain and Pacific Coast states, is this trend less than 50 pct accomplished. Even in cool New England, 51 pct of the offices are air conditioned. In the South, from 71 to approaching 100 pct (in some areas) of all offices are air conditioned.

The real problems you face in beating the heat occur in production and manufacturing areas where the problems (and economics) are not so easily solved.

### Problems in Production

Some of the complicating factors are the nature of the human body, the type of heat generated, type of work done, construction of the building, and many others. You must take all of these into consideration in solving specific heat problems.

Industrial hygienists who specialize in heat problems agree that too few in management understand the basic factors in heat problems. Management education is a prime consideration of heat control specialists.

A first step in solving your problem is understanding it. While most of the principles have been recognized for years, getting management to acknowledge them is difficult. Once management agrees to work on it, a lot can be done, one leading authority confides.

### Basic Methods

The basic methods of heat alleviation are: general ventilation, exhaust from hot operations, exhaust of hot air, blowers such as fans or jets, and air conditioning.

First step in taking on the heat problem is to make sure your plant areas get the best possible effect from natural ventilation, with doors and windows open, with natural exhaust of hot air and fumes through roof vents.

Where natural ventilation is not sufficient, systematic use of blowers can be arranged for rapid exchange of air or a cooling flow through plants and manufacturing areas.

Elementary general ventilation of doors and windows for a na-

## How Regions Rate the Hot Weather Problem

| Region | Not Serious | Mildly Serious | Serious |
|---|---|---|---|
| New England | 45% | 49% | 6% |
| Middle Atlantic | 35 | 57 | 8 |
| South Atlantic | 42 | 54 | 4 |
| East N. Central | 36 | 51 | 13 |
| East S. Central | 46 | 42 | 12 |
| West N. Central | 55 | 32 | 13 |
| West S. Central | 50 | 45 | 5 |
| Mountain | 100 | 0 | 0 |
| Pacific Coast | 59 | 34 | 7 |
| Total | 40 | 50 | 10 |

IA IRON AGE SURVEY

tural flow of air works with some effectiveness in small buildings. It has little or no effect, except in the vicinity of windows, in big plants, particularly if in crowded manufacturing areas.

### Simple Improvements

There are some simple devices and methods you can adapt to counteract the effect of distance in ventilation.

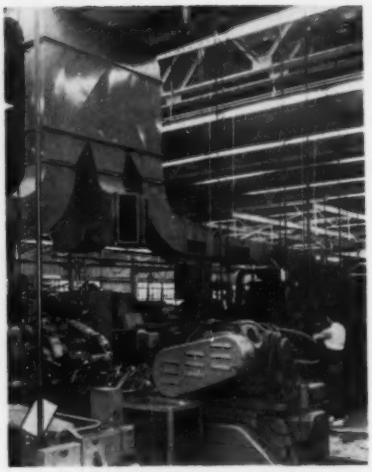
The basic problem of general ventilation is that the inside of a building becomes hotter in the summer than the outside temperature. The problem is to dispel the excess heat, replace it with fresh, cooler outside air.

After a threatened walkout in final assembly at Cadillac, a relatively old, long and narrow building, 48-in. panel fans, of 17,500 cfm capacity, were installed every 66 ft in sequence throughout the length of the final assembly line. These had the effect of continuous air motion and proved to be satisfactory to personnel.

This is relatively easy in a small building, and the method used at Cadillac is suited to a building of that construction. But what can you do in the large, low ceiling, single floor plants covering millions of sq ft of area?

Basic method is the simple exhaust fans, with many of them placed at intervals throughout the building. Most plants have them, and they work well to dispel stale air from central areas. But these are too far from fresh air sources, and air is stale, hot or humid before it traverses the distance from windows or other sources.

One practical solution is to reverse the flow of the exhaust unit, making it a blower. With half of the exhaust units working as blowers, an economical way of improving the general exhaust system is developed. It's an elementary law that blowing is a much more effective method of moving air than exhaust, which dissipates the effect rapidly.



MAKEUP air system is strategically located at Oldsmobile Div. plant.

But blowers at ceiling level have their limitations, and ventilation specialists are becoming increasingly aware of the importance of bringing outside air down

# *Everybody's Talking About*

## Heat as a Labor Relations Problem

◆ THERE is no escaping the fact that heat and ventilation are involved with labor relations. While very few plants or facilities exist where heat is a health hazard, labor is constantly driving to improve working conditions—with these mixed reactions:

**"Heat is a labor relations problem, not an engineering problem," says superintendent of large automotive plant.**

**"Frankly, if it wasn't for labor, we couldn't make as much headway as we have in heat and ventilation improvement," admits an industrial hygienist of a large company.**

**"While air conditioning of plant would be an unjustified expense now, the unions may force the issue some day when they haven't any other red hot working conditions to complain about," says a plant manager.**

**"Air conditioning is becoming a factor in labor relations," says an electrical equipment executive.**

**"In previous years, whole departments or entire plants would leave early on very hot days. Last year we stated that any individual who could not stand the heat could leave at any time . . . but we would not tolerate group action. . . . We had perhaps 12 employes who left early during entire summer," reports another plant executive.**

**"Public demands and union demands will pressure building owners to provide air conditioned spaces," reports a consulting engineer in an independent survey.**

**"When we get a heat complaint, we check it and fix it. We can't let it become a grievance for the union," says a manufacturing superintendent.**

## Let Them Do It

◆ IT'S AGREED by ventilation and cooling experts that if a worker has some control over his cooling device, such as directing a vent, turning on or shutting off a fan, the morale improving effectiveness is multiplied. For example:

◆ **Self-adjustment is one of the most important aspects in cooling and ventilation. The old idea**

to the floor level, or as close to it as possible. This might be called the "artificial ceiling," where the intent is to ventilate or cool the lower six or eight feet of a building—the occupied area.

An elementary method is to install a sleeve to a roof blower, bringing the outside air to the level of the worker. To do the most good, the sleeve should have an adjustable diffuser that can be controlled by the men working in the area. A serious complication here is that if cranes are used, it may be difficult to lower the sleeve to ground level without interference. But if possible, this may be the most practical method of general ventilation.

### What They're Doing

What can you do in your own manufacturing areas, after the possibilities of general ventilation are exhausted?

THE IRON AGE Survey shows that 71 pct of all metalworking plants employ man-cooling fans, 75 pct use special blowers or exhausts, and 15 pct have plant areas all or partly air conditioned. It goes without saying that all use general ventilation and roof exhausts where possible.

### Forced Ventilation

Other mechanical measures include roof sprinklers, insulated or specially painted roofs, evaporative air cooling, water cooled roofs. Surprisingly few applications of reflective screening or shields are noted.

Going a step further in ventilation is development of a system of forced ventilation, with ducts. This is particularly effective if your plant has hot spots to be cooled and it is desirable to direct air at them.

Overhead duct work is also troublesome in heavy industry where cranes are necessary. In some new plants, ventilation ducts have been installed below ground.

The sky is really the limit in how much effort and expense a company puts into its heat control. But those that do make the effort and investment, find it pays off in efficiency, morale, and attracting better workers.

In the Ford Motor Co. Cleveland foundry, for example, 15¢ of every dollar of construction costs went to provide ventilation. Ventilation engineering at all new Ford plants is aimed at limiting the summertime interior average temperature rise to not more than 10° above outdoor temperature.

New Ford plants have incorporated a method of ventilation which involves ducts along building columns so that the fresh air is delivered to the breathing zone (another application of the "artificial ceiling" idea) rather than into the high temperature zone near plant roofs. Fresh air velocities of from 2500 to 3000 cfm are used for average conditions.

For such operations as heat treating, air velocities and quantities are selected to meet the special requirements and the heat source is shielded with exhaust hoods installed to remove heat as quickly as possible.

K. E. Robinson, Industrial Hygiene Dept., General Motors Research Staff, says "it's a logical approach to bring air down to the occupied zone and project it with the same equipment that is used with heat in the winter."

### Know the Problem

To evaluate any specific hot spot, it is necessary to understand man's own adjusting process, temperature, humidity and air motion factors, and of heat itself.

Factors in heat control are the temperature of the air, the temperature of surrounding objects, relative humidity and air motion. The human body generates a certain amount of heat, depending on surrounding temperature and body activity. Heat generated must be balanced against heat lost to surrounding air.

It's obvious that when the surrounding temperature approaches body temperature, less heat is absorbed by surrounding air. Then, this must be supplemented by evaporation from the lungs or body surface in perspiration.

# Heat Problems

**that it will just give a man something more to play with is wrong.—Staff engineer of a basic metal producer.**

**◆ In our experience, where air conditioning is applied, many complain of drafts and we have to install shields for some people. But we have no complaints where a man can regulate control of a fan.—Vice president of ball bearing company.**

## A Lot Depends on Geography

◆ EFFECT of plant location on heat problems is relatively significant. But watch out for propaganda in sample survey comments quoted here:

**"Our plant is located in Colorado Springs . . . It's always cool in Colorado."**

**"Have two air conditioners at home so I can be comfortable there after a miserable day with Kansas City's 110°—90 pct humidity."**

**"Kane is the ice box of Pennsylvania. During June, July, and August we open windows if it becomes too warm inside."**

**"We have no hot weather problem in Duluth."**

**"Being in the hills of Vermont we have considered it hardly necessary to air condition the manufacturing area."**

**"Here in Oklahoma we are used to working in hot weather . . . However, air conditioning increases efficiency and production on jobs requiring close skills."**

Everyone knows the effect of relative humidity. If the air is moist, it can absorb only so much moisture from the surface of the skin. It is evaporation of moisture that has effect of cooling skin temperature. The lower the humidity, the greater the cooling effect. Air motion is also a factor, as the more rapidly the air moves, the greater its cooling effect.

Fortunately, most industrial processes contribute heat with little or no moisture. Where wet heat is contributed, such as in pickling, vapor absorption systems may be necessary. Another simple device is a hooded exhaust system which draws off vapor from the source.

George C. Stoecker, Industrial Hygiene Dept. Research Staff, General Motors Corp., points out that "hot spots in many plants have been corrected by formulating sound answers to a few basic questions:

What determines whether an environment is acceptable or not acceptable? What is the nature of the heat problem? Why don't local exhaust and fans improve the condition (as frequently occurs)? What is the source of heat and what can be done about it?

If you try to answer these questions, you will be making important progress in solving your problems.

### Heat Transfer

"Heat generated in an industrial operation has to be transferred from the point of development to a receiver before effects will be noticed. Transfer can be by convection, by conduction, or by radiation," Mr. Stoecker explains.

"Convected heat is the transfer of heat energy by movement of the surrounding air. The hot-air furnace in your home is a good example. Conducted heat is the transfer of heat energy within the same object."

In general, convected and conducted heat are readily understood and most industry has installed measures to combat them with ventilation, fans, exhausts and generally recognized methods of heat alleviation.

Less understood is radiant heat. Its control affords the widest opportunity for improving working conditions in metalworking, where so many heat generating operations are employed. It also may be the easiest to alleviate, if understood, with probably the least expense and work disruption.

The problem in radiant heat is that it is transferred like radio waves which are emitted outward from the source until they are received. Radiant heat comes from sources such as hot surfaces of furnaces, molten metal, is not fully detected by a regular thermometer. But the human body is an excellent absorbing medium.

### Black Bulb Temperature

To measure radiant heat, a hollow metal sphere with the thermometer sealed inside is used. The globe must have a dull, black finish to minimize reflection—hence the term, black bulb temperature.

When you detect radiant heat, usually in combination with convected heat from the same source, the solution is simple. Plain aluminum sheet has high radiant heat reflective powers. An aluminum shield between the source and the worker can mean vast improvement at low cost.

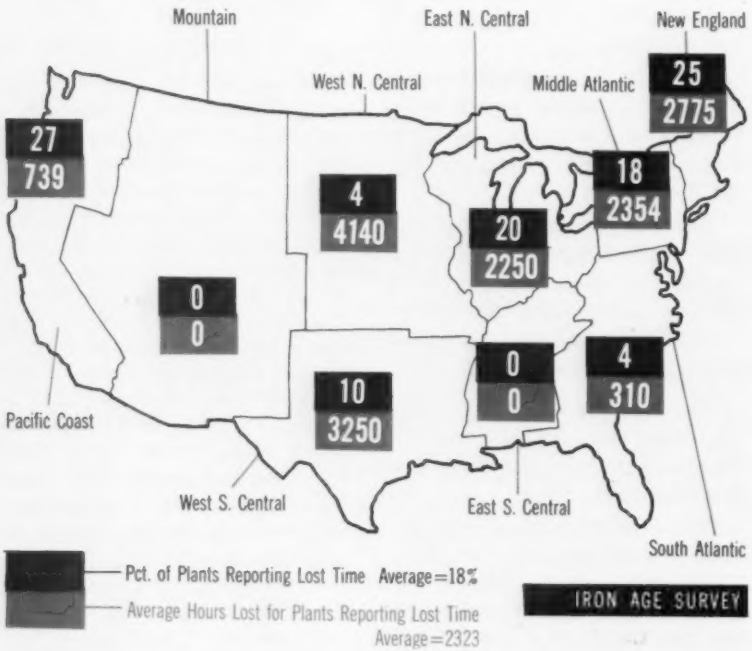
Incidentally, effectiveness has nothing to do with the thickness of the aluminum. Foil would be as effective as thick sheet, except for the difficulty of installation. Corrugated sheet is usually used because of its rigidity and durability. One thing—effectiveness goes down as the sheet becomes dirty. Aluminum paint also has good reflective properties.

### Shielding Effects

At one installation, temperature imediately in front of a heat treating furnace registered 160°. A corrugated aluminum shield dropped the temperature to 113°.

In evaluating any hot spot, blowers, exhausts, and shielding should be considered jointly, as no single method is apt to be fully successful in a troublesome spot.

## How Much Time Does Hot Weather Lose?



## Extent of Industry Air Conditioning

Simple man-cooling fans can be very effective, particularly if radiant heat is not present. They are effective to about 95°, but diminish rapidly at 105°, where they take on the effect of a simple blast of hot air.

When you combine forced ventilation and exhaust with shields against radiant heat, results are generally better than you may expect and worker comfort and efficiency are greatly improved.

### Evaporative Cooling

In one troublesome operation at GM's Guide Lamp Div. canopy exhaust hoods for control of convected heat with radiant heat shields on rollers were used on an operation involving heating, sealing and annealing glass. Shields reduced the radiant temperature at the work stations as much as 24°.

A development that is recognized more and more as a valuable tool, with great potential in cooling, is the evaporative cooler or washed air system. It is particularly effective when outside air temperatures are very high, say over 100° or more. Then, ventilation has dubious effect since it only involves replacing hot air with air as hot or nearly as hot. Evaporative cooling is accomplished by forcing outside air through a water spray. Because it has the effect of raising humidity, supplementary air supply may be needed.

Evaporative cooling is more expensive than blowers but where conditions warrant it, it can be well worth it. In one aluminum company, an installation serving 18 men in a permanent mold department cost $24,000 to install, but it was believed that more than that was saved in increasing production in a short time. It was considered more than worth the cost in terms of improved labor relations.

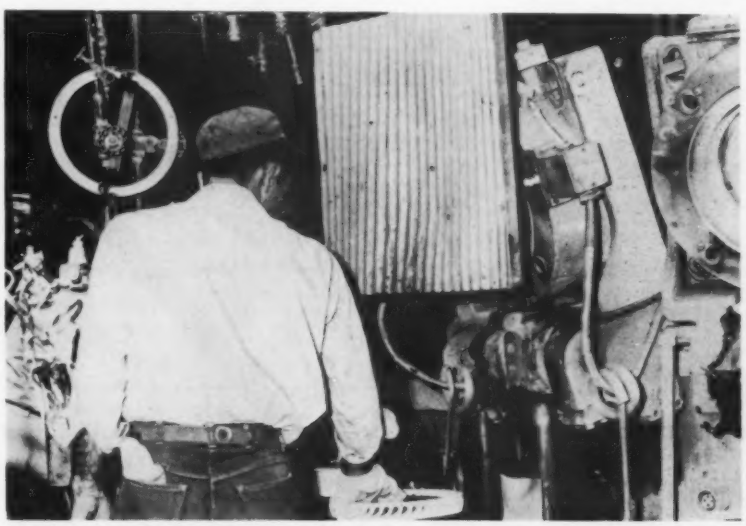
### New Ideas

There are any number of less general forms of fighting hot weather problems that you might consider.

There is a growing trend to use of a water blanket to insulate the roof. At its new Philadelphia area plant, Leeds & Northrup provides a six-inch pool of water on the roof. The plant has nine temperature zones. Temperature controls record outside "shade" and outside "sun" temperatures. These two are fed into an integrator to adjust blowers for internal temperature control.

Aluminum roof paint is another simple, but effective application.

Use of air conditioned rest areas is growing. Dr. L. S. Brouha, E. I. du Pont de Nemours & Co., has found that short rest periods in air conditioned "recovery room" several times a day can help make workers who labor in very high



SIMPLE ALUMINUM shield protects employee's face from radiant heat emitted by the upper half of the hot die on this turn-table molder at GM's Fabricast Div., Bedford Foundry. Shielding is also inexpensive.

temperatures as productive and happy and healthy as those who work at ordinary temperatures.

Blasts of refrigerated air from spot refrigerators are also used for localized cooling of very hot areas where general cooling is impractical.

### Air Conditioning

The problem of industrial air conditioning has no rule of thumb, but must be weighed at each special plant. Design of the building, nature of operations, climate, economics, are just a few of the things to be taken into consideration.

At the moment, most industrial air conditioning installations have been prompted by need for constant temperatures.

SKF Industries in Philadelphia, major bearings manufacturer, has all its assembly and inspection rooms air conditioned, with the primary purpose to obtain humidity control for rust prevention and filtered air for dust control. When these areas were air conditioned, rust losses went down substantially, complaints were reduced.

E. C. Brodin, vice president of SKF, says the company "has not been able to pin down increased efficiency." During World War II, the company operated a large air conditioned plant, which did not show any efficiency improvement over the Philadelphia plant which was not air conditioned.

But in a tight labor market, the company could readily hire employees of higher qualifications because of the air conditioning. SKF's program is to air condition the entire office space and to expand it in additional inspection and assembly areas.

Many other studies point to improved efficiency in air conditioned plants. Air conditioning is unanimously pointed to as factor in obtaining higher caliber workers and is becoming a must in precision industries or any operation where constant temperature or atmosphere is needed for dimensional control or other reasons.

THE IRON AGE Survey indicated these areas most often air conditioned: assembly areas, inspection, laboratories, engineering departments, production areas, gage rooms, and cranes.

The worker himself can help his own cause by following a few basic health rules in hot weather. And your industrial relations departments can do a lot to encourage this by posting rules and advocating observance of them.

Principal point is for the worker to eat an adequate and balanced diet. Short rest periods should be encouraged. Salt or similar tablets should be available.

Most important—he should be advised to use alcohol in extreme moderation or not at all.

While there may be some minor exceptions, it can generally be said that no office building of significant size is being constructed in the U. S. today that is not air conditioned.

In planning a new office building, air conditioning the building will run roughly 15 pct more than the cost of heating alone, air conditioning industry spokesmen say. In an old building, costs depend on type of construction, size, and type of heating equipment.

While there are many arguments pro and con on the issue of package units against central systems, one point stands out—it's quickest to install window units, providing it isn't necessary to rewire the entire building.

COMMON scene: Installing office air conditioning.

## Trend in Future Industrial Air Conditioning

| City (New Construction) | 1960 Pct. | 1970 Pct. | 1980 Pct. |
|---|---|---|---|
| Dallas | 75 | 90 | 95 |
| Houston | 50–75 | 100 | 100 |
| Detroit | 7 | 21 | 60 |
| St. Louis | 0 | 25 | 70 |
| Cleveland | 7 | 20 | 35 |
| New Orleans | 50 | 75 | 100 |
| Atlanta | 40 | 80 | 95 |
| San Francisco | 3 | 12 | 25 |

Source: Trane Co. Survey

*Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th St., Philadelphia 39, Pa.*

## The Iron Age SALUTES

### *Thomas W. Pangborn*

**As President of Pangborn Corp. for half a century, his work in improving foundry blast cleaning technique is matched only by his efforts to aid worthy causes. Society has benefited from his success.**

Thomas W. Pangborn literally blasted his way to success in the steel industry with shot and grit. He is accredited the development of blast-cleaning techniques used by many foundries today. To his credit, also, are numerous charitable endeavors. His contributions to social welfare are more gentle than his industrial processes, but no less effective.

Born in Leroy, Minn., he began his business career as an industrial salesman calling on foundries. He was quick to discover a bottleneck in cleaning room methods. Wasting little time, he began experimenting with a machine for continuous blast cleaning of cylinder blocks and other cast and forged parts. In 1904, he opened a small shop in New York City. With business growing annually, he moved the plant to Hagerstown, Md., in 1912.

Today, his firm is a leading producer of blast cleaning and dust control equipment. Still directing the firm's activities at 75, Tom Pangborn is a successful man by anyone's standards. But that is only half the story—and perhaps the least important half.

During his years in business, Tom Pangborn never lost sight of human values. As a leading Catholic layman, he has been active in many church and civic affairs. Numerous charitable organizations benefited as he prospered. He established the Pangborn Foundation for dispensing financial aid to worthy causes, created 10 scholarships in foundry practice and is serving as a trustee for numerous colleges, hospitals and other institutions.

In recognition of service to society and industry, he has received honorary degrees from several colleges including the University of Notre Dame. The American Foundrymen's Society this year created the Pangborn Gold Medal in his honor. Because of him the world is a better place in which to live—and foundries better places to work.

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# The Iron Age INTRODUCES

**John A. Matousek,** named ass't to president, **Baker-Raulang Co.,** Cleveland.

**H. H. Burrows,** elected senior vice president, Rubber Sales Div., **Raybestos-Manhattan, Inc.; R. B. Hazard,** elected vice president and sales manager, rubber and packings; **S. J. Synnott,** named assistant sales manager, rubber products; **C. V. Vetell,** named manager, rubber product sales.

**Harold F. Nunn,** elected vice president, **Henry Disston & Sons, Ltd.,** Toronto.

**William N. Matheson, Jr.,** elected vice president, operations, **Oliver Iron Mining Div.,** Duluth, Minn.

**W. L. Vande Water,** named general manager, dealer relations, **GMC Corp.,** Pontiac, Mich.

**Lawrence L. Garber,** elected vice president, production, **H. K. Porter Co., Inc.,** Pittsburgh; **Eugene Salinger,** named general manager, Henry Disston Div., Philadelphia.

**Harold S. Geneen,** named executive vice president, **Raytheon Manufacturing Co.,** Waltham, Mass.

**Russell R. Menard,** appointed manager, marketing administration, Plastics Dept., **General Electric Co.,** Decatur, Ill.

**Lyle F. Gulley,** appointed vice president, operations, **Granite City Steel Co.,** Granite City, Ill.

**John T. Burns,** appointed manager, western region, aircraft products sales, **Vickers, Inc.,** El Segundo, Calif.

**Don S. Holstein,** named ass't manager, **Armco Steel Corp.,** Middletown, O., Works; **Ora E. Clark,** appointed general superintendent, operations; **Donald C. Osborne,** appointed ass't to general superintendent; **Forest M. Morrow,** named area superintendent, West Processing, Stainless, and Coating Dept's.

**Evan E. Engle,** named general foreman, Annealing Dept., cold strip mill, **Republic Steel Corp.,** Warren District.

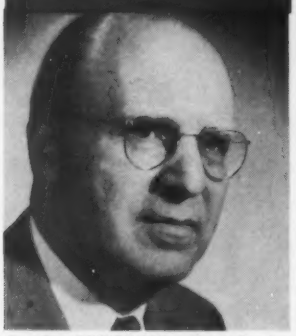
**Andrew E. Josephson,** named production manager and director, purchasing, **Jarvis Power Tools, Inc.,** Middletown, Conn.

**Maxwell D. Millard,** appointed general manager, sales, American Steel & Wire Div., **U. S. Steel Corp.,** Cleveland.

**Ralph E. Bevis,** named director, Latin American Operations, **Ferro Corp.,** Cleveland; **Ad Posnick,** named managing director, Ferro-Brazil.

**George A. Markell,** appointed ass't sales manager, **The Elwell-Parker Electric Co.,** Cleveland.

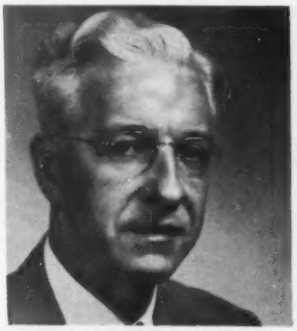
**A. C. Drake,** named general construction superintendent, General Engineering Dept., **Electro Metallurgical Co.,** Niagara Falls, N. Y.



R. O. PETERSON, elected vice president, Brush Div.—Engineering, Osborn Manufacturing Co., Cleveland, O.

EDGAR C. BAIN, elected assistant executive vice president, operations, Research and Technology Div., U. S. Steel Corp., Pittsburgh.

J. B. AUSTIN, elected vice president, fundamental research, Research and Technology Div., U. S. Steel Corp., Pittsburgh, Pa.



M. W. LIGHTNER, elected vice president, applied research, Research and Technology Div., U. S. Steel Corp., Pittsburgh, Pa.

# H&K

## SURFACED PERFORATIONS

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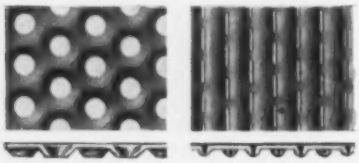
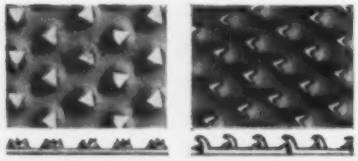
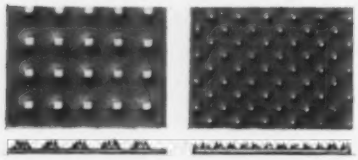


Small Indented Round Holes | Indented Slots



1/16" Triangular Stabbed Holes | Hooked Stabbed Holes



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**Charles M. Offenhauer,** named manager, administration, Metals Research Laboratories, **Electro Metallurgical Co.,** Div. of Union Carbide and Carbon Corp., Niagara Falls, N. Y.

**Boyd W. Bullock,** appointed manager, marketing, Laminated and Insulating Products Dept., **General Electrical Co.,** Coshocton, Ohio.

**R. H. Jones,** appointed general manager, Air Conditioning Div., **General Electric Co.,** Bloomfield, N. J.

**Charles R. MacDonald,** named head, Chicago district sales office, **Palmer-Shile Co.,** Detroit; **Edward A. Baker, Jr.,** appointed to sales dept., Detroit.

**Donald G. Wilson,** named master mechanic, Detroit operations, **Vickers, Inc.,** Detroit.

**Olof H. Hellsund,** named Western district engineer, Steel Belt Conveyors Div., **Sandvik Steel, Inc.,** Los Angeles office.

**Homer L. Gibbs,** appointed field engineer, St. Louis, office, **Norton Co.,** Worcester, Mass.

**Dr. Joseph T. Benedict,** joined the staff, Bayonne Research Lab., **The International Nickel Co., Inc.**

**Eric G. Peterson,** appointed industrial sales manager, **Sperry Products, Inc.,** Danbury, Conn.; **Frank E. Pringle,** appointed assistant industrial sales manager; **Tracy W. McFarlan,** named field sales supervisor, Philadelphia; **John E. Bobbin,** named sales engineer, Philadelphia; **Sheldon Leonard,** named sales engineer, Chicago.

**Richard E. Whitney,** appointed sales engineer, Detroit branch, **Inland Steel Products Co.,** Milwaukee.

**James F. O'Neill,** appointed sales representative, New York, Can Div., **Crown Cork & Seal Co.,** N. Y.

WILLIAM F. BURCHFIELD, appointed supervisor, technical service, Development and Research Div., International Nickel Co.

A. E. SMITH, named chief project engineer, General Engineering Dept., Electro Metallurgical Co., Niagara Falls, New York.

W. C. BERG, JR., named assistant to vice president and general sales manager, Blaw-Knox Co., Pittsburgh.

CLARK R. HIBBARD, named sales manager, The Fosdick Machine Tool Co., Cincinnati, O.

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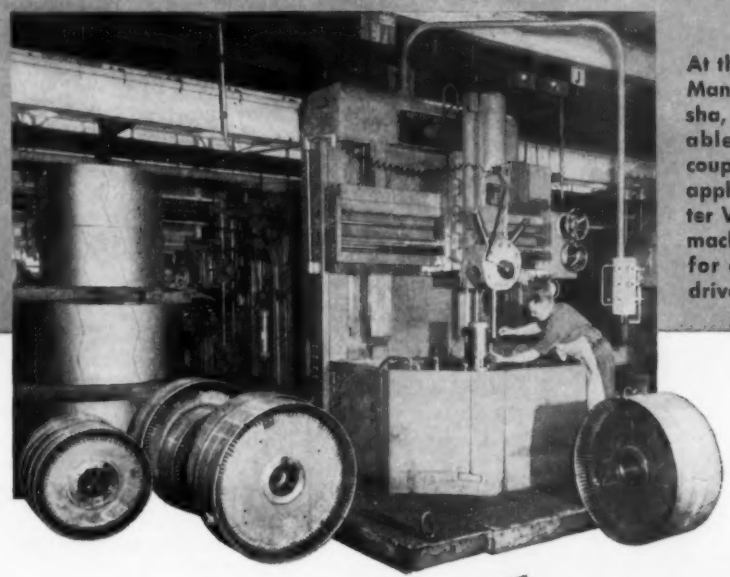
## MODEL 75



**At the Dynamatic Division of Eaton Manufacturing Company at Kenosha, Wisconsin, producers of adjustable speed eddy-current drives, couplings and brakes for industrial applications, the Bullard Cut Master V.T.L., Model 75 is employed to machine the clutch rotor assembly for a big industrial punch press drive.**

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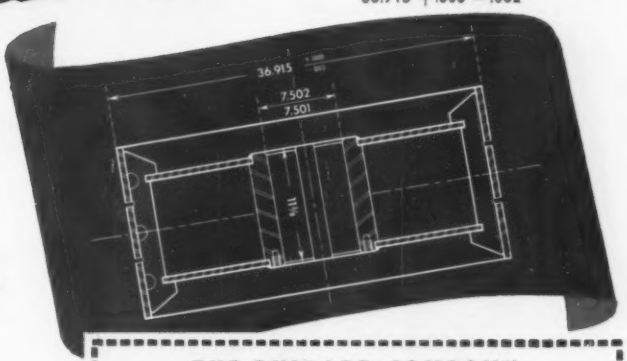


Both operator and management praise the performance of the Cut Master, Model 75, "there's no comparison; the old machines I had to fight . . . this one holds once it is set. Setting up is easier and the controls are handy . . . it is easy to keep up work standards with a minimum of spoilage." The advantages embodied in the Bullard Cut Master V.T.L., Model 75 can be applied to your machining problems.

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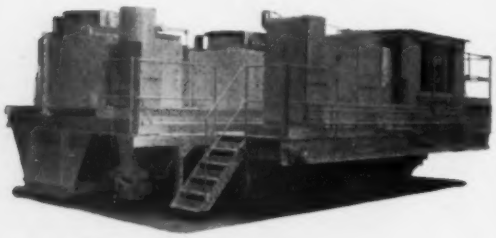
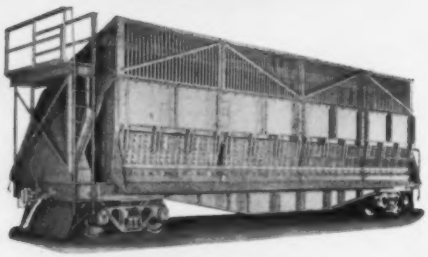
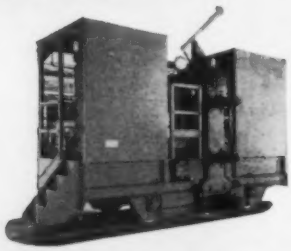


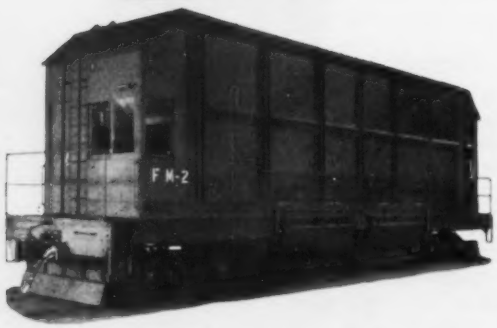
COKE QUENCHER



HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR

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## PERSONNEL

Following appointments are within the Wabash Div., **Raybestos-Manhattan, Inc.**, Crawfordsville, Ind. **Clarence P. Schneider,** named general manager; **Norman L. Caldwell,** named factory manager; **Dr. Ben T. Collins,** named director, research and product development; **LeRoy Musselman**, named Division Comptroller.

**Richard D. Keller,** named ass't sales manager, Machine Tool Div., **Pratt & Whitney Co., Inc.,** W. Hartford, Conn.

**J. W. Hayes,** appointed sales manager, **Baker Castor Oil Co.,** subsidiary of National Lead Co., New York; **L. J. Jubanowsky,** appointed eastern sales manager; **R. L. Vignolo,** named Pacific Coast sales manager, Los Angeles headquarters; **R. E. Rulison,** named district sales manager, Chicago.

**Arthur Leaver,** named sales engineer, Chicago and eastern Missouri, Abrasives Div., **Elgin National Watch Co.,** Elgin, Ill.; **John Wiziarde,** named sales engineer, Ohio sales territory.

**Edward J. Anderson,** appointed sales engineer, midwestern states, Chicago office **Sandvik Steel, Inc.,** Fair Lawn, N. J.

**Dean Strand,** appointed abrasive engineer, Chicago area, **Bay State Abrasive Products Co.,** Westboro, Mass.

**W. B. Brooks,** appointed senior metallurgist, Dow Texas Div., Electrochemical Engineering Dept., **The Dow Chemical Co.,** Freeport, Tex.

### OBITUARIES

**Gordon Fox,** 69, retired vice president, Freyn Div., **Koppers Co.**

**Dr. Charles R. Austin,** 58, assistant to the president, **Meehanite Metal Corp.,** New Rochelle, N. Y.

**Carl W. Johnson,** one of the founders of Cleveland Graphite Bronze Div., **Clevite Corp.**

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2. **Constant, positive accuracy.** Balanced air system positively controlled. It can't drift.
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5. **Longer range per magnification** .003" and .0015", on 2,500 to 1 and 5,000 to 1 respectively, takes care of 90% of gaging requirements and provides the following advantages:
   *Greater Plug Clearance.*
   *Longer approach range.*
   *Longer gage head wear.*
   *Greater jet protection.*
6. **Fast, easy setting.** Positive setting in ten seconds.
7. **Easiest to install.** Connect directly to air supply. Filter already attached. Pressure regulator assures ample protection — only 40 lbs. pressure required.
8. **Less maintenance.** Gage system better protected. Larger jets stay clean. Maintenance negligible if properly installed.
9. **Easily adaptable to special requirements.** May be combined with electrical and electronic units for **automatic gaging and machine control.**

**This air gage system is basically different from that of other air gages.** One side of this system—the measuring side — is *rigidly fixed.* There is no adjustment and measurements *cannot vary.* Hence, the gage *is linear* over its long range and *can be calibrated* and *set with a single master.* Because of this, the Dimensionair is an air gage of dependable stability. *It cannot drift . . . throughout its long range.*

**The balancing side of the system** has a *single* zero adjustment. This enables you to set the Dimensionair positively and instantly to zero, *with a single master.* Excess bits of dirt, oil or water *do not* affect the Dimensionair any more than they do other air gages. *But,* some gages are too *insensitive* to show up such failure.

**If you are familiar with ordinary air gages** requiring two masters, you'll appreciate the advantages of using *one* master. You *save half the cost of masters . . .* set the gage easily and simply . . . experience, for the first time, the feeling of *dependable, non-drifting,* precise measuring.

**The Dimensionair's basic system** enables it to be *combined directly* with electrical and electronic units as used with *Machine Control* and *Automatic Sorting Gages.* This obviates the accessory equipment required by other air gages and permits higher speeds, greater precision — with assured stability. It is much easier to set the gage to the spread between electrical contacts; e.g. the spread between the machine's fine feed and the finish feed. Adjusting to zero *does not* affect this spread setting.

**Check these facts for yourself.** Have a Dimensionair installed in your plant now.

**Compare it with any other air gage** you may already own or any you may wish to have brought in for comparison.

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*Title*.....

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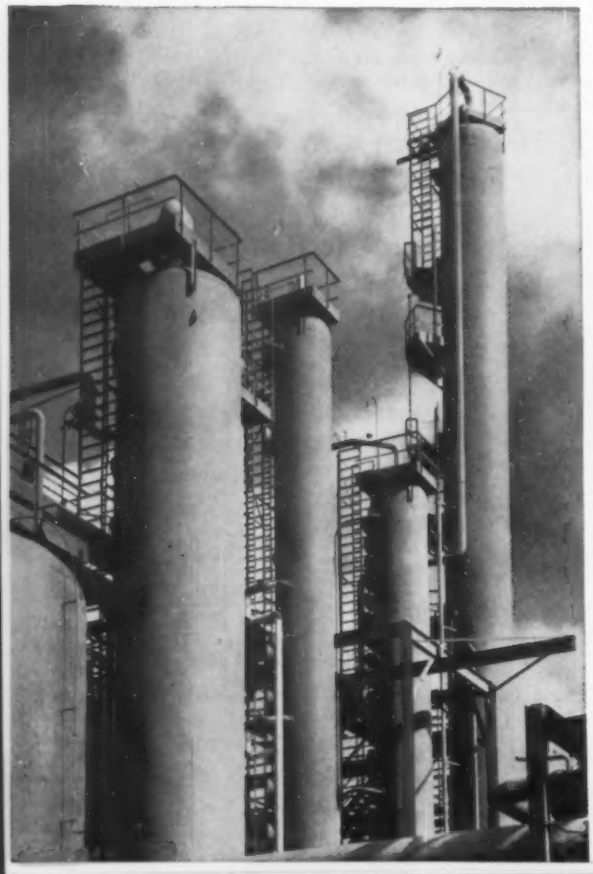
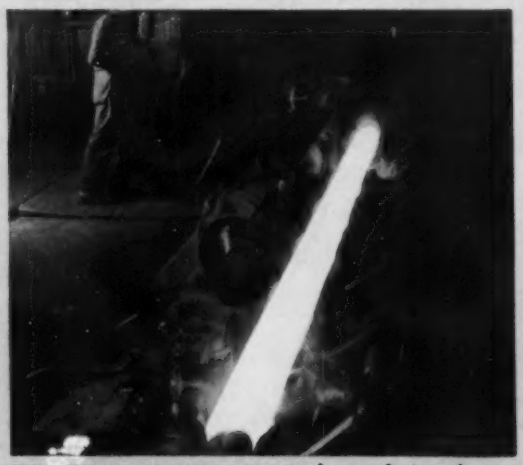
NATIONAL SEAMLESS STEEL BOTTLES go underground to store gas the modern way. Safe from all surface hazards, each 39-foot, 3-inch bottle, 24 inches in diameter, will hold 25,000 cu. ft. of gas at 2,240 p. s. i. Before shipment, each bottle is subjected to a high pressure hydrostatic test, assuring the ultimate user safe, long-time service.

IN THIS 625-MILE PIPELINE, from Wyoming to Missouri, are 45,000 tons of National Seamless Pipe, in sizes of 20, 22, and 24 inches O.D. Service Pipe Line Company laid the line to bring crude oil from the Rocky Mountains to midwest refining centers. Outlet capacity of the line can reach 245,000 barrels per day.

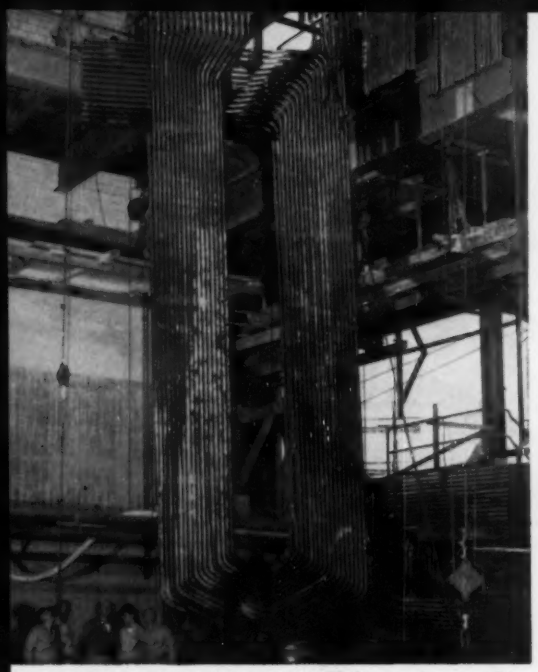
REFINERIES RELY ON 2 DOZEN DIFFERENT ANALYSES made available by National Tube—each designed to handle specific refinery conditions such as corrosion, oxidation, high and low temperatures, and pressures. Other chemical compositions are also available in tubular products, and a wide variety of high temperature problems are now under study.



# BACKBONE OF A NATIONAL



THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.



SUPERHEATER COILS BEING POSITIONED for use in one of today's modern giant superheaters. Here, steam at more than 2000 psi is superheated to 1000 F. Severe as this duty is, it poses no problem for National Seamless.

THE 100-TON B-47 STRATOJET has a heavy-duty landing gear, consisting of dual main wheels in tandem which support the fuselage, and single outriggers attached to the inboard engine pods. The outer cylinder of each of these rugged outrigger struts is fabricated from cold drawn tubes of National's Shelby Seamless Mechanical Tubing.

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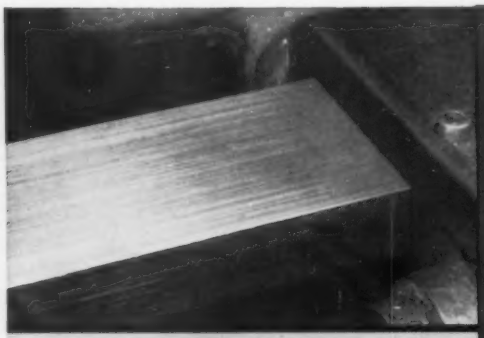
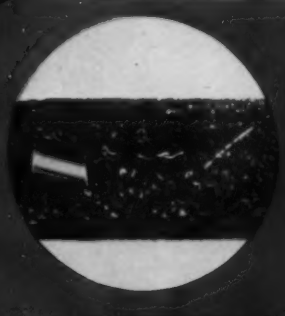
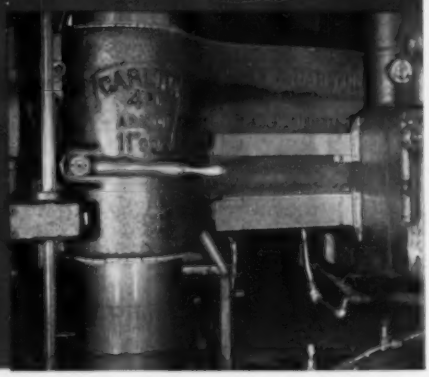


This close-up photograph shows harmful chips and abrasives trapped in a fibrous wiper that permitted scoring of the lathe way shown at left.

The extent of scoring and abrasion caused by chips trapped under the carriage is clearly shown in this photograph of a lathe way.



C/R Way Wipers are quickly, easily installed on this milling machine, as well as on shapers, grinders, planers, and gear cutters.



The clean, score-free wiping action of C/R Way Wipers is evident again in this partial view of a radial drill. Note how close, accurate lip contact on the column is achieved, even though the wiper is mounted on uneven surfaces.

How many hundreds of dollars are scoring and abrasion of machine tool ways costing your shop each year . . . dollars that could easily be saved? C/R Sirvene (synthetic rubber) Way Wipers make it unnecessary to tolerate this expensive damage. They are designed and precision molded for an extremely accurate fit. They will *not* trap harmful materials . . . will not mark or smudge ways. They will wipe ways clean of dirt, chips, fine abrasives . . . even water emulsions . . . yet leave a thin, protective oil film. C/R Sirvene Way Wipers will fit flat ways, side rails, angles, columns and hydraulic rams . . . and are easily installed. They will save you many times their cost. Please write for illustrated brochure that gives complete details.

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FEATURE ARTICLES

Replaces pack method—

# Get Top Quality Carburizing With Zone Control

◆ Commercial heat treaters have been debating the merits of pack vs gas carburizing for a long, long time . . . But gas carburizing in a zone control atmosphere furnace adds a new and important twist . . . It's fast, continuous, relatively cheap.

◆ Applied to high quality gears, the zone control technique is put to the "acid test" . . . Here's a first-hand account of how zone controlled atmospheres eased handling, saved alloy, and improved end product quality—at lower overall cost.

By H. C. HARRIS, Metallurgist, Mack Mfg. Corp., Plainfield, N. J.

◆ THE BIG SWITCH from pack to gas carburizing has become a marked, and fairly consistent, trend in recent years. Not all heat treaters go along with it, but there are a number of highly realistic arguments in its favor. Quality is an important consideration, but comparative costs are also a determining factor.

When Mack Mfg. Corp., Plainfield, N. J., decided to consolidate its gear manufacturing a few years ago, it also studied the possibilities of improving its heat treating operations. It was at this point that the time-worn question of gas vs. pack arose. After weighing all factors, it was finally decided to abandon the pack carburizing operations previously employed and switch to gas.

As a leading manufacturer of high quality trucks and buses, Mack has always had to meet extremely stringent requirements for its carburized transmission and rear axle gears. But in the face of competitive conditions, it could never afford to overlook operating costs.

Three major factors were primarily responsible for Mack's final decision in favor of gas carburizing. First on the list is the fact that the labor and mess of packing parts in carburizing compound and boxes are eliminated. Second, with gas carburizing process control is readily obtainable through instrumentation. Last—and most important from a quality standpoint—wear, fatigue and impact tests on comparable steels show gas carburizing to be far superior to pack carburizing.

High quality carburizing isn't entirely simple and straightforward. It calls for careful planning, starting with basic objectives in the form of specifications.

In line with developing specifications, Mack's laboratory showed that case carburized gears should have a surface carbon content of about 0.80 pct *maximum* for optimum wear and service characteristics. It was also determined that fatigue and impact properties could be

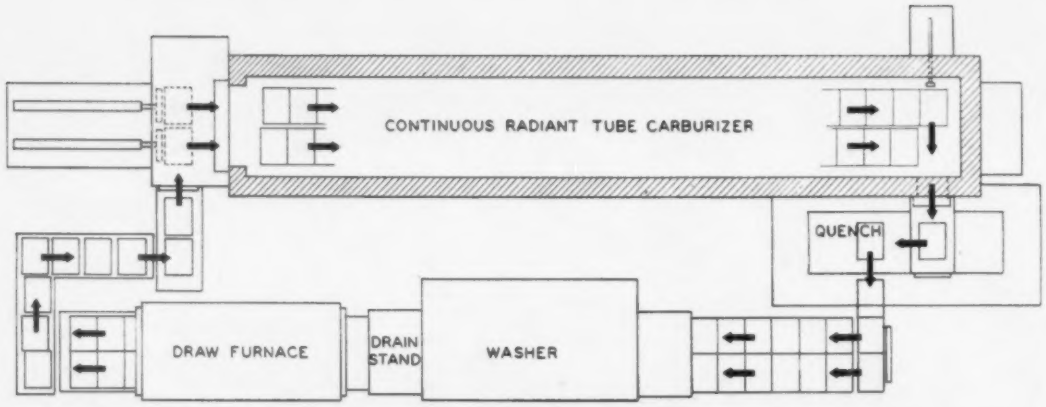



Fig. 1—Schematic drawing illustrates how entire heat treat processing line forms a closed loop.

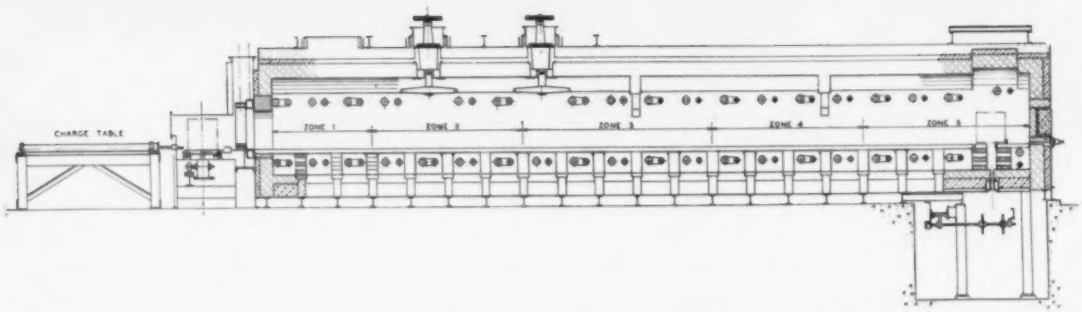



Fig. 2—Main furnace, divided into 5 zones, is radiant tube fired and operates on city gas.

improved by maintaining the surface carbon in the 0.70-0.80 pct range. Surface hardness requirements for the gears were set at Rc 60-63.

By holding surface carbon content near the eutectoid, the case was found to be free of both cementite and austenite. Elimination of retained austenite permits consistent attainment of maximum hardness in the quenched and tempered case. Major problem was to maintain surface carbon content at not more than 0.80 pct and still provide sufficient case depth (0.040-0.070 in. to Rc50), without requiring unduly long carburizing cycles.

A variety of alloy steel is used for the production of case-hardened gears, including 8620H, 4023, 8625H, 8627H, and 4320H. With the improved physical properties attained with a controlled low surface content, it has been possible to use steels lower in alloy content and still maintain a higher standard of quality. This has resulted in a considerable reduction in material cost.

From a process standpoint, the key to meeting the quality specifications lies in carbon potential control of the gas carburizing atmosphere. Surface carbon content of the case is a function of the carbon potential of the furnace atmosphere. Since carbon potential is readily measured by dewpoint, dewpoint is used as the controlling factor in maintaining the furnace atmosphere.

In a conventional gas carburizing system the carrier gas and suitable enriching gas are manifolded and introduced to various zones of the furnace. With this system, it is difficult to attain effective case depths of 0.040-0.70 in. without developing hypereutectoid cases in the range of 1.00-1.25 pct.

### Zone method aids control

Another method of procedure is to introduce the carrier gas plus the enrichment to the carburizing zone of the furnace and then introduce the carrier gas alone to the diffusion zone of the furnace. This produces a lower carbon content in the outer skin of the case. This method is not entirely satisfactory for cases where the specified carbon content is less than 0.90 pct at the surface.

A third method—now used at Mack—has proved to be completely satisfactory. Natural

Propane and carrier gases are manifolded and introduced at the second and third zones of the furnace. This supplies gas of high carbon potential in the carburizing stage of the process. Straight carrier gas is introduced at zones 4 and 5 of the furnace.

Near the discharge end, straight air is bled to the furnace at a controlled rate of 5 to 15 cfh. This method provides consistent control of the surface carbon content of the case at a maximum level of about 0.80 pct. It means operating with a carbon potential of 1.30 pct at the charge end, compared to a carbon potential of 1.10 pct obtainable with the second method. With the 1.30 pct carbon potential it is possible to carburize much faster than with the lower carbon potential.

Because of high production requirements, it was decided to combine the process advantages of gas carburizing with the operating features of continuous production. To meet this need, Surface Combustion Corp. supplied two continuous lines for the carburizing operation.

### Use radiant tubes

These lines are in duplicate and each consists of a continuous two-row tray pusher carburizing furnace together with enclosed quench. Each line also includes a two-row washer-rinsing machine and convection air draw furnace.

The entire line is connected by suitable conveyors and handling mechanisms to form a closed loop. Trays are located with gears at the charge end of the carburizer and are moved into the side entering vestibule of the furnace. They are then pushed through the furnace to carburize the work, and an oil quench follows.

The loaded trays are removed from the quench, washed and rinsed, and passed through the draw furnace. They are then returned by a cross conveyor and transfer car system to the charge end of the carburizing furnace. The general arrangement of the lines is shown in Fig. 1. Capacity of each line varies from 530 to 900 net lb per hour, depending upon time-temperature cycle and case depth desired.

Divided into five zones (Fig. 2), the continuous gas carburizing furnace is radiant tube-fired and uses city gas. It is equipped with a combination charge car and outer charge vestibule door. Work is discharged through a vestibule by a push-out mechanism into the hot oil quench.

### Quenching is automatic

All quenching is carried out in oil maintained at about 150-160°F. The major portion of gear production is quenched through a hooded quench elevator arrangement. This is an automatic process. Those gears requiring press quenching are removed through a side discharge door and press quenched manually.

Prepared atmosphere for carburizing is supplied by two Surface Combustion RX endothermic gas generators with 2400 cfh capacity. These generators catalytically crack a mixture of propane and air to form the carrier gas. They are used to supply atmosphere to the two continuous gas carburizers as well as a set of pit-type carburizers. The RX generator gas is enriched with propane to the desired carburizing potential for Zones 2 and 3.

In the continuous furnace, Zone 1 is the heating zone. Carburizing is handled in Zones 2 and 3. Straight RX generator gas is introduced in Zones 4 and 5. To maintain the carbon potential at a suitable level for a maximum of 0.80 pct carbon in the surface of the carburized case, air is carefully metered to the furnace at Zone 5.

To establish standard conditions for the various types of work processed, dewpoints and gas analyses are regularly made on the gas from the generator, at the manifold, and in each of the five zones of the furnace. Typical gas analyses, temperatures, and dewpoints in the various zones of the furnace are shown in Table I.

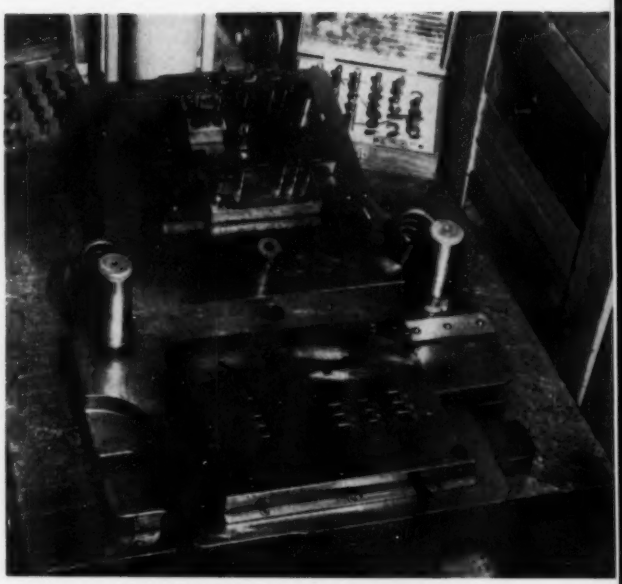
Introduction of air to Zone 5 is controlled by means of a small orifice and a pressure gage. The amount of air introduced in cfh is an inverse function of the ambient dewpoint. When the ambient dewpoint declines—as it does in the winter months—the amount of air is raised to provide a total moisture content that will maintain the proper carbon potential. Other adjustments are sometimes necessary during a 24-hour period due to changing humidity.

**Cycle 10 min. per tray**
**Work load 150 lbs, net per tray, average**

| Temperature, °F | Zone 1 1625 | Zone 2 1700 | Zone 3 1700 | Zone 4 1700 | Zone 5 1525 |
|---|---|---|---|---|---|
| Atmosphere Analyses, pct | | | | | |
| $CO_2$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| $O_2$ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CO | 24.4 | 24.2 | 24.4 | 24.0 | 23.8 |
| $H_2$ | 31.3 | 33.0 | 32.0 | 32.8 | 32.6 |
| $CH_4$ | 1.0 | 1.4 | 1.0 | 0.6 | 0.6 |
| $N_2$ | 43.3 | 41.4 | 42.6 | 42.6 | 42.8 |
| Dewpoint, °F | 16 | 5 | 17 | 26 | 40 |
| Carbon Potential | 1.22 | 1.30 | 0.87 | 0.54 | 0.78 |

**With interchangeable punches—**

# Midget Die Stamps Out Variety of Parts



MINIATURE PROGRESSIVE DIE features interchangeable punch inserts, successively stamps 15 parts.

◆ Fifteen different (but basically similar) small stamped parts rattle off this high speed press, thanks to a miniature progressive die . . . Production rate now is 5000 hourly, versus 600 per hour earlier.

◆ Interchangeable punches provide startling flexibility . . . One press, one operator now handle stamping requirements on all 15 blank designs . . . Stacking arrangement boosts production rates right down to final assembly.

By HERBERT CHASE, Consultant, Forest Hills, N. Y.

◆ FIFTEEN DIES combined into one stamp 5000 small flat parts hourly where 15 individual dies previously couldn't exceed a rate of 600. The eight-fold increase on the same workpieces results largely from interchangeable punches incorporated in a midget progressive die setup.

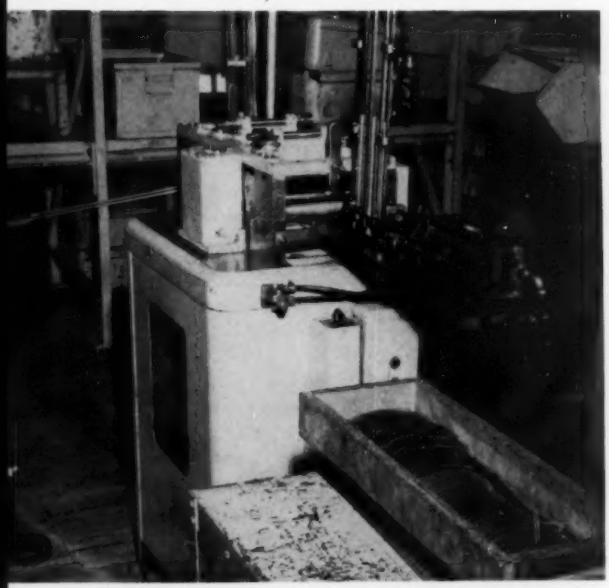
The operator changes only the punches. Without alteration, the female die bed accommodates all the fifteen variations in punch arrangement.

Each Executive electric typewriter built at the Poughkeepsie, N. Y., plant of International Business Machines Corp. requires 42 of these simple, flat stampings. Known as selector bars, the 4⅞ in. long parts involve 15 different patterns. Bars differ from one another only in small details.

Until recently, production of each of the 15 designs called for a separate blanking die. Whenever a particular bar pattern ran, the corresponding die required its own press setup. Frequency of individual die use involved large

yearly expenditures in setup time alone. When several bars ran at the same time, often the case, production people rushed extra presses and operators into service.

A single progressive die eliminates these extra costs, plus others associated with maintaining, handling and storing 15 different dies. Interchangeable punches put to successive use enable the single die to stamp all 15 different parts.



NEATLY ARRANGED typewriter selector bars (r.), feed to straightener (center), stack at left.

Major advantage of punch inserts lies in virtual abolishment of press setup delays. Inserts slip in and out of punch plate sockets in a few moments without need for resetting the whole die.

Moreover, a single press blanks the 15 different parts in successive runs. When not in use, inserts fit into suitably marked recessed holes in conveniently located boxes. In changing a blanking pattern, the setup man quickly picks out the needed punches and locks them in place.

In its first station, the progressive die always blanks the same basic part. At the second, third and fourth stations, the inserted punches cut away part or all of certain tabs. They also shear and punch as required for the particular part in process. At the last station, the press shears the part from its skeleton.

Formerly, each individual blanking die stamped only 600 selector bars an hour. The new die, designed for a press operating at much higher speed, produces 5000 hourly. The higher speed contributes greatly to the over-all economy of the revamped operation.

### Less handling, fewer tote boxes

Still further savings result from arranging the press so that blanked parts do not drop randomly into a tote box, as previously. Now they feed onto a pair of inclined parallel bars, down which parts slide to form a stack. When the stack builds to a suitable height, the press operator lifts off parts and lays them in a shallow tote box.

Parts pass through flattening rolls in a secondary operation. A manually-loaded magazine rapidly feeds the rolls. Below the magazine, a slide reciprocates at high speed, actuated by the piston rod of an air cylinder. Each time the slide advances, it wipes one selector bar from the bottom of the stack and feeds this bar into the straightening rolls.

Until IBM installed this magazine feed, an operator hand-fed bars picked individually from a tote box. Rate then was only 350 hourly. With the feed, parts run through the equipment at 2000 to 3000 per hour. The operator simply watches the machine, loads the magazine, removes stacks of straightened parts.

Straightened selector bars emerge from rolling equipment and stack in the same way as at the blanking die. Parts handle conveniently. Tote boxes hold three to four times as many orderly-arranged as randomly-dropped parts.

A more important economy results from faster handling in any required operation subsequent to straightening. If the job calls for a machine (e.g., drill or press), magazine feed from a stack again boosts production speed. Too, pickup from an orderly parts stack reduces chances of interlocked parts or cut fingers in manual loading and unloading. This can speed up production as far removed from the straightening rolls as final assembly.

**Challenges metalmakers—**

# Nuclear Industry Wants Better Steels

◆ Metal and alloy makers are often confused about what the nuclear industry wants from them . . . There have been good reasons for this . . . Secrecy was one, but it's fading rapidly . . . Misunderstanding about end uses is No. 1 cause for confusion at present.

◆ This article takes a big step toward setting the facts straight . . . Nuclear industry will keep buying special metals plus the more common alloys . . . Stainless steel, for example, has a "moderate"-use future, but reactor designers want better, stronger grades.

By R. C. DALZELL, Acting Chief,
Engineering Development Branch, Div. of Reactor Development,
U. S. Atomic Energy Commission

◆ COMMERCIAL METAL PRODUCERS sense that they have a place in "this nuclear business." But they're confused by the requirements. Result is that their market surveys, their research, development and diversification plans, and their other long range management efforts stumble over apparent snags and contradictions.

Probably the popular confusion is caused primarily by a lack of understanding of the role and significance of the special and commercial metals used. This has been augmented by a few cases of unusual specifications on otherwise commercial metals.

Zirconium, beryllium, cobalt, thulium, boron, cadmium, hafnium, tantalum, and several other special metals are mentioned frequently in connection with atomic energy. The first two in particular have had considerable publicity.

Of the more common metals, the U. S. Atomic Energy Commission has, from time to time, bought substantial quantities of stainless steels of various types. A large part of these purchases has been type 347.

It is generally assumed that practically all AEC pu. hases are for some kind of reactor. This is not correct. Material bought by the AEC, whether stainless steel or other commodities, may be for reactors, or for chemical processing plants or research and development facilities. End use might be in medical research, weapons development, utilization of fission products, waste disposal, and so on.

Some of the unusual metals previously mentioned are peculiarly suitable for nuclear reactors. Certain ones are well known as artificially radioactive substitutes for radium or X-rays. Others are spoken of as "poisons" for reactors, useful as control rod materials, but objectionable as impurities.

In many cases the uninitiated have the correct information but a misconception of the significance. As a result, time and money have been wasted in considering special specifications, special heats, special stockpiles of master alloy,

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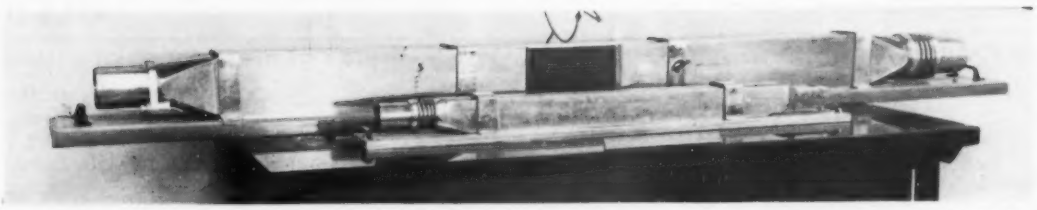
Almost any U. S. citizen or company with a legitimate interest in atomic energy can secure an "Access Permit" to explore restricted non-weapons data. To spread information as widely as possible, AEC sends each access permittee a package of literature telling what's available in unclassified literature, listing films, giving selected readings in atomic energy. The packet also contains eight bibliographies of civilian application reports, a list of the hundreds of papers given last summer at Geneva, etc. In short, enough for an intelligent approach to almost any civilian application problem in the field.—THE EDITORS



**COMPLEX melting, alloying, forging, rolling, machining and other processes are involved in the fabrication of these two nuclear reactor fuel elements made by Babcock & Wilcox.**

and on actual research and development work.

Furthermore, market analysts have been misled in gaging the impact of this growing industry on future steel markets.

One fact seems well established: Within a given reactor core there will probably never be an *important* amount of stainless steel or other "high cross-section" material. Some reactors might require stainless steel in the core, but the poundage would not be industrially significant.

To some extent, all elements are "poisons" for nuclear reactors. The degree varies not only according to the different elements, but also according to the speed or energy of thermal ("slow") neutrons. Table I indicates, in $cm^2/g$ units, the relative tendency of various elements to capture "slow" neutrons. This tendency is usually called "thermal neutron absorption cross-section."

Physicists and other atomic scientists prefer to work in units called "barns" and to deal with alloys in terms of atomic percent. Table I, however, is expressed in handy units* which permit engineers to calculate the effect of various weight percentages of elements in an alloy. The table includes only those elements which might be found in steels.

Aluminum may be taken as a reference point in Table I. It has been completely satisfactory for many reactors. It is cheap, plentiful, has excellent mechanical and corrosion properties at modest temperatures, and has a low cross-section.

Lead has only one-tenth the cross-section rating of aluminum. Due to density, though, an equal thickness would be only about twice as good as aluminum. But the mechanical properties of lead at temperatures of several hundred degrees Fahrenheit rule it out as a reactor structural material.

Zirconium, beryllium, and magnesium are the only other metals with lower cross-sections than aluminum. Magnesium would be excellent if it had adequate corrosion resistance to hot water. Zirconium is expensive, and beryllium is *very* expensive.

But the reactor designer in many cases can afford to pay the price for zirconium because (1) it withstands very high temperature water, necessary for reasonable thermal efficiency of the steam power plant, (2) required quantity of U-235 is minimized, and (3) the size and therefore the over-all cost of the reactor is also minimized.

Passing beyond aluminum — columbium is extremely expensive, and zinc lacks corrosion resistance to hot water. Molybdenum is rather costly and is difficult to fabricate into some forms that would be required for a reactor.

Iron base alloys come next. Involved calculations are required to decide between stainless steel and a zirconium alloy for use in a reactor. Finished reactor cost, U-235 inventory, life requirement, temperature limitations, and cost of chemical processing for spent fuel elements are some of the factors which must be weighed. There is definitely a penalty associated

* For metals, barns $\times \frac{0.606}{\text{atomic wt.}} = cm^2/g$

## TABLE I

THERMAL NEUTRON ABSORPTION CROSS-SECTION FOR ELEMENTS

| Element | Cross-Section ($cm^2/g$) | Element | Cross-Section ($cm^2/g$) |
|---|---|---|---|
| O | 0.000007 | Mo | 0.015 |
| C | 0.00022 | Fe | 0.026 |
| Pb | 0.0005 | Cr | 0.032 |
| Be | 0.00067 | Cu | 0.034 |
| Zr | 0.0010 | Ni | 0.046 |
| Zr (+Hf) | 0.009 | V | 0.055 |
| Mg | 0.0015 | W | 0.060 |
| Si | 0.0025 | Ta | 0.070 |
| P | 0.0036 | Ti | 0.073 |
| Ce | 0.004 | N | 0.080 |
| Al | 0.0049 | Se | 0.092 |
| Ba | 0.005 | Mn | 0.14 |
| Ca | 0.0061 | H | 0.192 |
| Cb | 0.0072 | Co | 0.35 |
| S | 0.009 | Hf | 0.40 |
| Zn | 0.009 | Rare Earth mixture | 0.86 |
| | | B | 40 |
| | | Gd | 135 |

**Note — Practically all elements have very low absorption cross-section for "fast" neutrons. This table is only for "thermal" neutrons. There are very few "fast" reactors.**

**TABLE II**

347 STAINLESS WITH HIGH TANTALUM

| Element | Cross-Section ($cm^2/g$) | Pct in Alloy | Calculated Cross-Section (Col. 2 × Col. 3) |
|---|---|---|---|
| Fe | 0.026 | 72 | 0.0187 |
| Cr | 0.032 | 18 | 0.0058 |
| Ni | 0.046 | 8 | 0.0037 |
| Mn | 0.14 | 1.5 | 0.0021 |
| C | 0.00022 | 0.06 | 0.0000 |
| Cb | 0.0072 | 0.4 | 0.00003 |
| Ta | 0.070 | 0.2 | 0.00014 |
| TOTAL | | | 0.03047 |

347 STAINLESS WITH LOW TANTALUM

| Element | Cross-Section ($cm^2/g$) | Pct in Alloy | Calculated Cross-Section (Col. 2 × Col. 3) |
|---|---|---|---|
| Fe | 0.026 | 72 | 0.0187 |
| Cr | 0.032 | 18 | 0.0058 |
| Ni | 0.046 | 8 | 0.0037 |
| Mn | 0.14 | 1.5 | 0.0021 |
| C | 0.00022 | 0.06 | 0.0000 |
| Cb | 0.0072 | 0.55 | 0.00004 |
| Ta | 0.070 | 0.05 | 0.00003 |
| TOTAL | | | 0.03037 |

with using stainless steel, and there are definite advantages.

It is impossible to write a formula which gives a prompt answer for all reactors. As a rough guide, a given reactor design might use about thirty times as much zirconium as type 347 stainless steel, so far as U-235 requirement is concerned.

But it cannot be said that in any reactor, using one pound of type 347 instead of one pound of zirconium adds a specific percentage to the amount of U-235 required. A nuclear physicist would have to compute this amount for each reactor.

What about the importance of minor alloying elements in, for example, type 347 stainless? At one time, there was much discussion as to whether it was permissible to use high tantalum ferro-columbium as a stabilizer, or if the tantalum content had to be kept low.

Table II shows the calculated cross-section of type 347 to be 0.0305 $cm^2/g$. This is insignificant. Varying the chromium, nickel, or manganese within specification limits makes more difference than this. Practically, 18-8 stainless has a cross-section of 0.03 regardless of analysis.

Another argument advanced in this discussion was that tantalum becomes a very "hot" gamma ray emitter when exposed in a reactor. This is true, but since the steel becomes intolerably radioactive in the reactor anyway, addition of tantalum in this quantity has no effect on shielding requirements.

The same arguments were advanced regarding natural cobalt content of the alloying nickel. The same answers apply.

Some people advanced a more convincing argument. They pointed out that the reactor coolant would carry corrosion products into the heat transfer system, thus making it "hot"; also that the long-lived powerful cobalt and tantalum atoms would increase the maintenance difficulty. Practical answer is that the cooling system is so hot it must be shielded and chemically cleaned for maintenance regardless of these elements.

One popular steel-making element which might conceivably be objectionable in reactors is boron. Fortunately, the steel makers do not use enough to create a problem for reactor builders. Gadolinium would be most objectionable, but this is an insignificant part of the rare earths used in some modern steels.

There is another typical question that comes up in reactor discussions: Since zirconium is good for reactors, is a steel enhanced for reactor use if it contains a few percent of zirconium? The answer can be calculated readily from Table I.

Looking ahead, there will be a gradually growing moderate market for stainless and other steels for the outer structures of reactors and for associated chemical plants. The reactor business does need new and better steels and it can afford to pay for special steels for some purposes.

The real need is for steels of higher yield strength than type 304, for example, with adequate corrosion resistance. Endurance limit is likewise a most important property for structural members that are inaccessible for maintenance and which are subjected to many thermal cyclings during the lifetime of a reactor.

The additional requirement imposed by this service is that these structural and corrosion resisting properties must be maintained during and after irradiation in a reactor.

Laboratories which develop interesting steels will have little difficulty arranging for irradiation tests, provided that complete pre-irradiation test data are supplied. The reactor industry will welcome them with open arms.

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HELPFUL HINTS on what the AEC buys and where can be found in "Selling to AEC," for sale by Superintendent of Documents, Government Printing Office, Washington 25, D.C. Price 25¢.

# Standardized Barrel Tumbling Pays Off

◆ Barrel tumbling standards are hard to come by . . . Many production people simply shrug their shoulders when asked to reproduce blend radii from lot to lot . . . Yet, such uniformity improves the product and cuts finishing costs.

◆ Developing barrel finishing standards needn't be difficult . . . Simply apply known principles to experimental lots . . . Results can point the way to using as few as two tumbling compounds, and only one chip size for a wide variety of parts.

◆ STANDARDIZED barrel tumbling is possible, practical and essential where finishes must be held within narrow limits. You can adjust job conditions to reproduce near identical surface finishes, as well as edge and corner blending radii in lot after lot of tumbled parts.

This can be done on a production line basis, without fuss, wasted time or large scale experimentation. With as few as two standardized tumbling compounds, the same chip mass can debur in one operation, burnish in another. It's all a matter of establishing standards to fit a variety of parts.

At the Indianapolis plant of Chrysler Corp., unless tumbling of the part lends itself to full standardization, it simply isn't tumbled. Another more controllable finishing method is chosen, even if general production opinion indicates the part is tumbleable.

Reason for such strictness lies in the plant's products: parts for the Chrysler Powerflite automatic transmissions. Removal from each part of almost microscopic burrs is vitally important. Burrs and wire edges can break off in service and drift into the hydraulic circuits of the transmission. Small metal particles can freeze internal valves, clog tiny parts and wear mirror-finished surfaces.

Repair at this point consists of complete disassembly and thorough cleaning of the entire 502-part transmission. In extreme cases, major overhaul is the only solution.

### Standardization cuts costs

An organized approach to mechanized finishing methods helps banish such potential dangers. The program includes tumbling, wire brushing and shell blasting. It makes possible considerable savings in annual finishing costs. Tumbling accounts for a substantial amount of the total.

In addition to deburring, tumbling serves also to remove heat-treat scale, to finish and brighten parts. Of the 120-odd transmission parts produced at this plant, 32 are tumble finished.

Tumbling, this metalworker found, reduces costs by eliminating much hand finishing and some automatic operations too, such as wire

brushing and shot blasting. It cuts production time appreciably. More uniform, smoother running parts result. Longer service life grows out of this.

Production-type experiments develop standards on each part considered for finish tumbling. When all concerned agree that a practical procedure produces acceptable results, the exact details and operating sequence go down in writing.

Separate job sheets clearly specify that the given operating method, material and equipment must not be changed by the operator or foremen. Only the master mechanics' division can authorize alterations. This they do through the general foreman, who alerts also the time study people. Such rigid requirements keep each and every tumbling procedure thoroughly under control.

An inspection sheet covers each part tumbled. Before its final draft, every department involved gets a chance to speak up on the quality standards needed for a particular part. The production supervisor, master mechanics' division, resident engineering and inspection departments or their representatives sign all inspection sheets.

### Buy one chip size

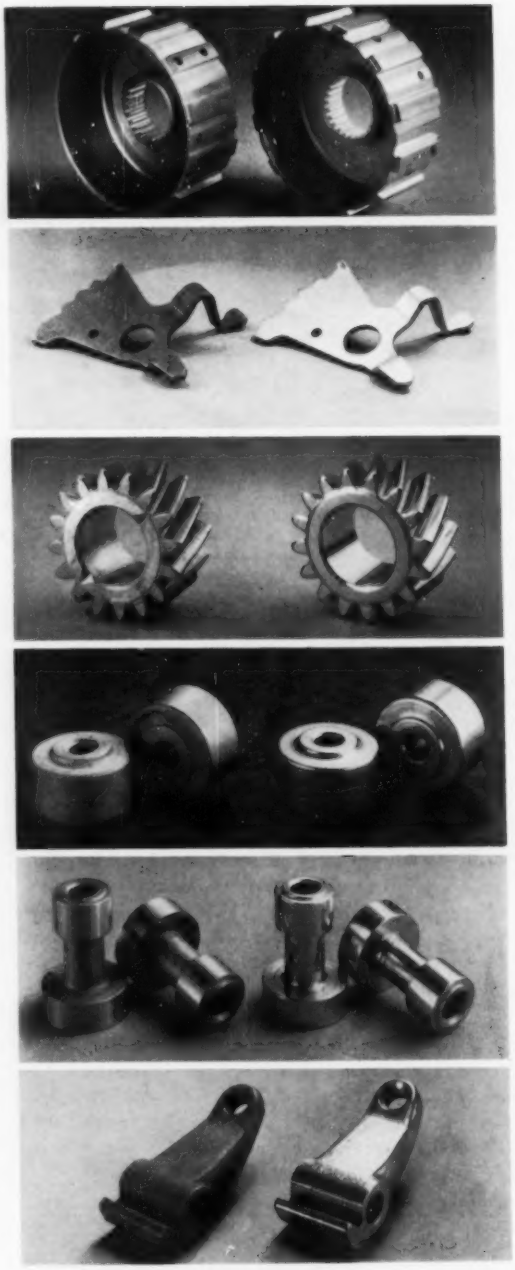
Tumbling equipment includes twelve barrels, each housing two 13 cu ft compartments; four barrels, each made up of three 5.2 cu ft compartments; and one barrel of four compartments, each measuring 6.7 cu ft. Ferrous parts tumble only in the largest compartments.

Of 32 different parts tumbled, 25 call for fused aluminum oxide chips and tumbling compounds supplied by Lord Chemical Corp., York, Pa. The plant stocks only one chip size, No. 1, greatly simplifying inventory. As the No. 1 chips wear in use, operators successively screen them through No. 1½, 2, 2½ and 3 sizes. This latter ends chip recovery, since sizes smaller than ½ to ⅜ in. are seldom used.

Once standardized conditions permit reproducing finishes from one part lot to another, shift your attention to controlling amount of material removed in tumbling. Change only one variable in the cycle at any one time. A few more parts per load may help retain a desired blend radius along one edge, while continuing to abrade a wire edge on another.

A semifinish grinding operation on a governor valve (see table at right) produces a wire edge along its valve lands. Tumble-finishing abrades this edge to a 0.003 in. blend radius.

All other edges, requests the designer, must remain sharp, or be broken on a radius of no more than 0.002 in. Standardized tumbling helps meet this requirement. In actual production, blend radii fall below 0.002 in.



## TABLE I Barrel Finishing Small Ferrous Parts

| Part | Material | Chip Mass (lb) | Load (in parts) | Chip Size | Speed (rpm) | Time (min.) | Tumbling Abrasive (lb) | Cleaning Compounds (lb) | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| Clutch Hub | unhardened pearlitic malleable iron casting | 1200 | 150 | 2 & 3 | 8 | 45 | 3 | 1 | chips and parts in alternate layers; water to topmost layer; avoid nicking parts; rinse in cleaner solution. |
| Lever manual valve | heat-treated mild steel stamping | 1000 | 3000 | 3 | 12 | 15 | | 3 | water to 4 in. from top of mass; separate magnetically, then wash. |
| Planet pinion | hardened alloy steel bar stock | 1200 | 1500 | 3 | 11 | 60 | | 3 | use smaller chips if desired; add 1½ lb all purpose compound; load and unload carefully; fill with water; triple rinse in cleaner solution. |
| Throttle-adjusting roller | carbo-nitride case-hardened mild steel | none | 10,000 to 50,000 | — | 16 | 20 | 3 | | self-deburring with abrasive, avoiding magnetic separation; water even with mass top; after draining, tumble-rinse 5 minutes in cleaner solution. |
| Governor valve | carbo-nitride case-hardened steel | 1200 | 1500 | 2 | 12 | 45 | | 3 | handle parts carefully; add water to load level; separate magnetically. |
| Reverse band lever | hardened alloy steel forging | 1200 | 1200 | 1 | 12 | 60 | | 3 | water to load level |

### Standardize Your Own Tumbling Too

Essential in developing tumbling standards is close control of raw materials and operations. Usually it's not a good idea to mix tumbling and cleaning compounds of one supplier with those of another. Same applies to equipment, where minor changes in barrel design can completely alter best tumbling speed and time. Make your choice, then expect to stick to it.

Wasting manhours?—

# Rubber Conveyors Adapt Easily To Changing Plant Needs

◆ Bulk handling of materials like coal, ore and sand is still a major use of conveyor belts . . . But improved materials, ingenuity in adapting various packaged, prefabricated belt conveyors to new problems has greatly extended their usefulness.

◆ Today, you can have about what you need: standard or special units, regular or special surfaces and finishes—even color tints, to facilitate sorting operations . . . Here are some of the current trends in belt conveyor usage.

By J. A. MULLER, Technical Manager, Rubber Div., Thermoid Co., Trenton, N. J.

MAGNETIC CHUCK holds these small steel parts fast to conveyor as they pass under crated abrasive belt inside machine for deburring.

◆ ASK THE AVERAGE plant man where rubber conveyor belts fit into the handling picture and he'll likely tell you "In moving bulk materials." He'll be right, as far as he goes—it's still a major use. But increasingly, belt type conveyors are finding other ingenious applications throughout industry.

Modern rubber conveyor belts are adapted to meet an amazing variety of plant problems. Today, you can specify standard or special conveyors, portable or fixed, for inside or outside use. You can have your choice among half a dozen finishes or surfaces, including holes, depressions, slots, knobs. You can even have your belts in color—green, tan, peach, white, or buff, rather than the conventional black—if color will simplify your sorting or small-parts-assembling operations.

Here's a brief summary of some modern-day trends in plant use of rubber belt conveyors.

Among these, particularly notable has been the increase in use of packaged, pre-fabricated belt conveyors in standard, modular lengths.

As a general rule, the belt user is well-advised to try to meet his needs from among these standard belts before considering the special types touched on above. Standard belts cost less initially, are easier to replace, require less lead time to manufacture, simplify standardization.

Incidentally, it's a good idea wherever possible to standardize belts in a specific plant by width as well as by type. This simplifies inventory problems and permits purchasing economies. At the same time, many belt machinery parts can then also be standardized, such as idlers and pulleys.

Packaged, prefabricated belt units offer the purchaser considerable flexibility. They're made in standard lengths, generally in 5 or 10 ft increments with motor, gear reducer, pulleys and idlers. The user merely bolts sections together, with very little engineering required, to get the length he wants. These packaged units can be extended or shortened, within limits, to meet changes in product or in process operations.

Belts used on packaged conveyors are usually of light weight and may be pigmented in pastel colors. For light, non-abrasive loads the belt may have no top or bottom cover, but only a carcass known as a friction surface.

For loading trucks and railroad cars, an ingenious unit called "Extendo" has been introduced, consisting of a basic conveyor unit with an unextended length of 8 ft. As loading progresses, the unit can be lengthened up to 14 ft by cantilevered sections. Thus the men don't have to walk with parcels but merely place them on the conveyor extension as it follows them into the truck.

EXTENDABLE conveyor unit "follows" men into trucks, boxcars to speed unloading as work progresses. Extendable sections are cantilevered.

One of these units at United Parcel Service in Philadelphia, caster-mounted, is kept on the truck loading dock so it can be rolled into position to service any one of several trucks. It's reported to have cut truck loading time from the 45 minutes formerly required to 21 minutes.

Where materials or parts have to be carried up a grade, portable conveyors equipped with rough top belting (now offered as standard) save time and effort. The units can be moved on casters and the angle of incline can be varied up to 35°. A typical application is in loading freight cars where a loading platform is not available for the job.

Warehouses sometimes use standard conveyors as temporary accumulating devices. When the material called for is varied, several conveyor branches in parallel store packages until an economic quantity for loading has been accumulated. Diverting packages to the proper conveyor is handled in several ways—manually, by mechanical switches, or electronically.

### Feeds grinders

Feeding parts through a grinding operation is another belt application. Here, parts are carried to an abrasive grinding belt by a standard belt. The conveyor belt acts as a resilient base in pressing the part against the grinder. A magnetic plate fixed under the belt at the grinding or polishing station holds the part securely on the conveyor.

Teaming two belts together has solved some unusual problems. In one installation, the bottom belt carries small packages in a sealing line, while the top belt exerts pressure on the package until the adhesive has set.

The foregoing all involve belts of standard construction for operating in standard temperatures. Many modifications of these belts are possible, to adapt them to special needs.

High temperature belts present their own special problems. Organic materials like rubber and cotton char and decompose in a fairly narrow temperature range above 300°F. For this reason special compounding and materials are frequently used, such as glass fabric, asbestos, metal and special elastomers.

Where the application justifies the expense, holes, depressions, lugs or ridges can be molded directly onto the belt. Flanged belts can prevent materials rolling off the conveyor, as they might with flat belts.

One conveyor belt has transverse grooves molded into the cover for carrying short round parts like rods and bolts. The center of the belt can be raised in a ridge or depressed.

Belt placement is important, particularly where space is a problem. If the belts are only for conveying, they should be located against a wall, overhead or under-the-floor where possible. Occasionally, they can be placed on an exterior wall of the building, suitably protected from the weather, for maximum space utilization.

Speedier die changes—

# Step Up Stamping Production With Flexible Press

◆ Production requirements on complex products like automatic transmissions have a way of changing . . . Equipment decisions on presses, other items, must be made with both today's variables, tomorrow's production needs firmly in mind.

◆ Detroit Transmission Div. is meeting its current needs for high stamping production plus flexibility with three Verson single-action, transfer type presses . . . Each turns out more than 1000 pieces per hour . . . Conveyors remove scrap.

By W. G. PATTON, Engineering Editor

◆ FEW PRODUCTION PROBLEMS remain conveniently static so that you can solve them and forget them. Tooling up for a product like an automatic transmission is no exception. It calls for careful planning, both to (1) meet today's production schedules and, (2) anticipate what future production volume is apt to be.

Planning engineers for Detroit Transmission Div. were up against this problem. Popularity of automatic transmissions, particularly for pasenger cars, is climbing rapidly. More than 70 pct of all automobiles being manufactured today have automatic transmission units. Several of the more expensive cars are 100 pct automatic. It seemed logical, therefore, for company engineers to anticipate a much bigger future market for their product.

### Adaptability needed

At the same time, equipment decisions would have to take into account possible engineering changes or the need, in future, for making additional stamped parts on existing equipment.

Verson single-action, transfer type presses are meeting the fast-growing requirements at the Hydra-Matic Willow Run plant. Combining unusually high output with versatility, three Verson presses now in operation can produce in excess of 1000 pieces per hour each, operating at 80 pct of capacity.

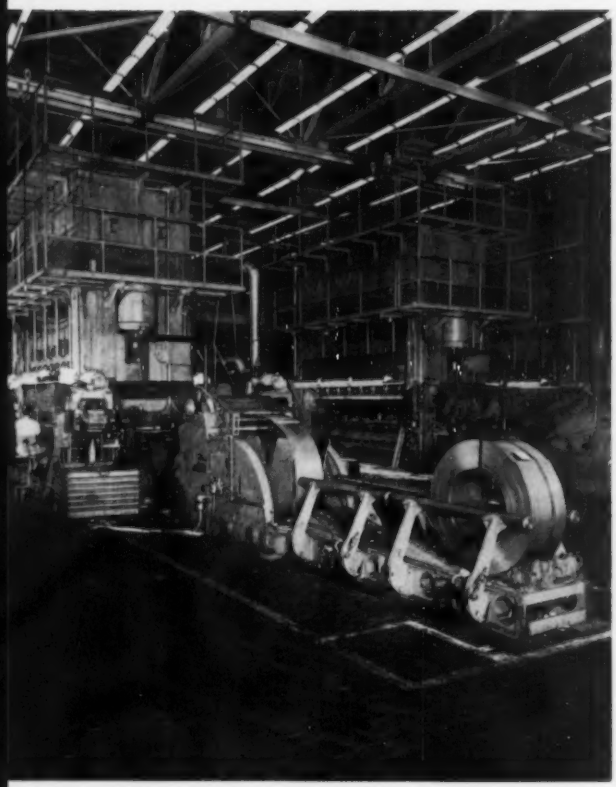
The presses are coil fed by Littell automatic coil straightening and cradling equipment. The press used for the torus front driven unit, for example, is produced in an 8-station, eccentric type Verson all-steel 800-ton press. By changing the final group of four dies, a second stamping, the torus front driving unit, can be made at the same rate.

Operations for the torus front driving unit include notch, draw, restrike, pierce, trim.

Die changes have been simplified by mounting the dies so they can be changed individually or as a group of four. Fast die changes, coupled with adjustment of stock feed from the floor (a new feature in such equipment), facilitates die changes. Press equipment and dies were built by the Verson Allsteel Press Co., Chicago.

Detailed press specifications are shown in the accompanying table.

SAE 1010 is fed directly into the press by the Littell unit which roll-straightens the steel as it comes off the coil. Cold rolled, aluminum-killed steel strip used for the torus front driven unit is 9⅞ in. wide.



SPEEDS to 20 strokes per minute are possible with this 8-station, 800 ton Verson press. Note extra coil storage space (foreground) on Littell automatic coil straightening and feeding unit.

## SPECIFICATIONS:

| | |
|---|---|
| Capacity of press | 800 tons |
| Stroke of slide | 12 in. |
| Strokes per min. | 20 |
| Individual slide capacity | 200 tons each |
| Individual slide adj. (hand) | ½ in. |
| Main slide adj. (power) | 12 in. |
| Pneumatic cushion capacity (stations 2, 3, 4, 5) | 48 tons @ 80 psi |
| Pneumatic cushion capacity (station 7) | 32 tons @ 80 psi |
| Pneumatic cushion capacity (station 8) | 2 tons @ 80 psi |
| Cushion stroke | 6 in. |
| Total Wt. (less dies & Littell Feed) | 331,000 lb. |

It will be observed that storage space for two coils is provided immediately behind the coil in use. New coils can be moved into position and threaded into the press in about 5 minutes.

A finished stamping comes off the press at every stroke. The press operates normally at 20 strokes per min.

Measured near the bottom of the stroke, the press is rated at 800 tons. Utilizing all-steel, tie rod construction, the overall height of this press room giant is 328 in. Weight (complete) is 380,000 lb.

### Slides adjust individually

The press's 8 slides are adjustable individually, using a ½ in. manual wedge adjustment. Extra long, square-type gibs are provided. These are adjustable in both directions. Both the steel bolster and the individual slides can be arranged to suit the die equipment. Cam dies can be used if required.

The press is equipped with a Verson flywheel air brake. There are eight combination, pneumatic and positive safety cross bar knockouts.

Steel gears and heat-treated steel pinions operate in a bath of oil. The flywheel runs on antifriction bearings. A 75-hp motor drives the mammoth press through a v-belt arrangement.

Another interesting feature of the press is that drawing compound is applied automatically at each die station as required.

A Cascade system lubricates both the press and the coil feed. Driveshaft and flywheel bearings are lubricated automatically. A pressure switch stops the press automatically in the event of a lubrication failure. Simultaneously, a red light goes on to warn plant personnel.

Automatic greasing is provided for gibways, counterbalance and cushion packings.

The transfer feed is mechanically actuated, having a length of feed stroke of 20 in. and an opening and closing stroke of 5 in. A single rack and pinion roll feed is used. This equipment feeds from 8 to 24 in. of steel strip with each stroke of the press.

Scrap removal is accomplished by a conveyor which runs the full length of the press on each side, emptying into tote boxes.

A number of additional safety features have been designed into this equipment. The transfer bars, for example, are equipped with shear pins. Metal guards shield the motor sheave, belts and flywheel. There is a hinged, expanded metal guard over the incoming rolls of the Littell feed.

Stick to the job—

# Reduce Metal Finishing Costs With Die-Cut Tapes

LETTERS of die-cut tape protect polished surface while rest of vase gets a buffed finish.

◆ WANT SOME HELP in cutting costs on finishing and decorating metal parts? You might be able to get a big assist from tough, super-sticky, pressure sensitive tapes. Idea is that pieces of tape, die cut to even the most complex design outlines, will firmly mask certain areas of metal parts while other sections are buffed, painted or sandblasted.

Tape backings can be paper, cloth, metal, synthetic films or laminates that will resist almost any type of wear in finishing operations. Special thin tapes maintain sharp outlines on lettering or other designs for maximum decorative effect. Good adhesives insure that tapes will stick to workpiece contours without shifting or sliding.

For example, cost of finishing metal vases, urns and other religious articles at The Herman J. Wolf Co., Philadelphia, has been greatly reduced with the help of pressure sensitive tape. Decoration on many of these pieces consists of religious symbols or inscriptions. Formerly, desired contrast between inscribed areas and the background metal was obtained by careful and costly hand engraving.

Seeking a way to cut these costs without sacrificing appearance and quality, the firm consulted Gleicher Mfg. Corp., Newark, N. J., producers of die-cut pressure sensitive tapes. Result was the development of a special, thin, paper backed tape that eliminated hand engraving and achieved savings of more than 500 pct.

### Get contrast by buffing

Present practice is to clean and carefully polish the workpiece in the design area only. Next, die cut tape is applied to this area and rolled on with a squeegee. Remainder of the workpiece is then buffed to a satin finish as shown in the accompanying photo. Buffing is done with an abrasive compound and a cloth wheel revolving at slow speed.

When the tape is finally peeled off, the inscription has a bright polish in contrast to the satiny background. Use of the thin tape keeps the outline of the letters clean and sharp. At the same time, the tape has sufficient shear adhesion and tear strength to withstand the action of the buffing wheel. Final operation is a cleaning and lacquering of the entire workpiece.

Other suggested uses for die-cut pressure sensitive tapes could include any metal object whose surface finish and appearance might be improved with contrasting design effects. Typical examples would be lipstick or cigarette cases, compacts, trophies, tableware and cooking utensils.

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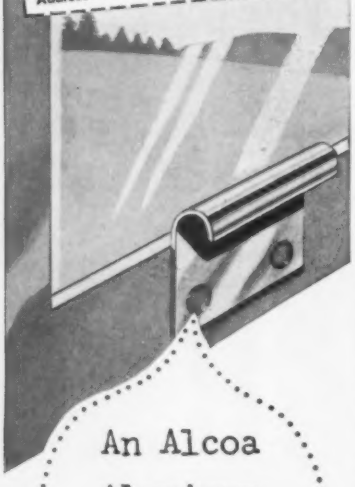

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# New Technical Literature:

## Catalogs and Bulletins

### Molten salt pump

Air-driven pump designed especially for pumping molten salts and metals is described in this bulletin. Advantages of an air-driven motor for operation under high ambient temperatures are discussed, and typical uses for the pump, such as emptying large aluminum heat-treating furnaces, are listed. Photo, sketch, and performance data are included. *Ajax Electric Co.*

**For free copy circle No. 1 on postcard, p. 129**

### Portable belt conveyors

Two new bulletins on portable inclined belt conveyors have been published. In addition to a general description, units application to loading, unloading, movement of materials into balcony and basement storage and stacking are given. Back page gives specification data. *Rapids-Standard Company, Inc.*

**For free copy circle No. 2 on postcard, p. 129**

### Metallic abrasives

Eighteen page, two color catalog discusses company's laboratory facilities, presents technical data, and illustrates various types of shot and grit produced. SAE specifications are included, as well as various types of cleaning and peening methods. *Cleveland Metal Abrasive Co.*

**For free copy circle No. 3 on postcard, p. 129**

### Used and new machinery

Firm has just published 40 page catalog listing their complete stock of used machinery and also describing in detail new machinery carried in stock. The catalog is described as a handy guide for every buyer of metal-working machinery. It contains several hundred illustrations. *Interstate Machinery Co., Inc.*

**For free copy circle No. 4 on postcard, p. 129**

### FOR YOUR COPY

***Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 129.***

### Steel weldirectory

A revised "Weldirectory for Mild Steel and Low-Alloy High-Tensile Steels" includes newest iron powder and other electrodes. This bulletin provides a description of each electrode, its physical properties and chemical composition, recommended welding procedures, an operator's reference table, and a list of typical applications for each electrode. *Lincoln Electric Co.*

**For free copy circle No. 5 on postcard, p. 129**

### Unit heaters

Latest improvements, specifications, and complete performance data for firm's horizontal and vertical unit heaters have been written into a new 36 page bulletin. It includes hot water and steam performance tables, dimensions, selections, applications, descriptions of cabinets, elements, motor mountings, fans and accessories, controls, suggested layouts, piping diagrams, and other technical data. *American Air Filter Co., Inc.*

**For free copy circle No. 6 on postcard, p. 129**

### Firm's weldments

Recently published bulletin describes seven benefits to purchasers of one firm's weldments. Particular attention is given to the fabrication of large custom - designed weldments such as pressure vessels, bridge structures, vehicular tunnel linings, etc. *Baldwin-Lima-Hamilton Corp.*

**For free copy circle No. 7 on postcard, p. 129**

### Vibratory equipment

Folder describes recently announced type of electro-permanent magnetic vibratory equipment. Line consists of vibratory feeders to feed bulk materials at carefully controlled rates of speed (ounces to tons), and unit vibrators to speed and assure the flow of materials from bins, hoppers, etc. Applications and operating advantages are listed. *Eriez Manufacturing Co.*

**For free copy circle No. 8 on postcard, p. 129**

### Set-up kits

Folder illustrates wide size range of set-up blocks and kits. These handy set-up tools are described as shop time savers for set-up of milling machines, jig borers, drill presses and other machine tools. Specifications are listed for 13 sizes with each size kit containing four extension nut couplers, four flange nuts, four T-slot nuts, four strap clamps and 24 studs with stud diameters available in 3/8, 1/2, 5/8 and 3/4 in. with three T-slot nut sizes available for each stud diameter. *Jergens Tool Specialty Co.*

**For free copy circle No. 9 on postcard, p. 129**

### Welding equipment

New 20 page buyers' guide for GE covers all types of welding equipment, electrodes, and accessories. Included are ac and dc general purpose and industrial welders, semiautomatic and automatic equipment, and carbon block brazing equipment. Ratings, dimensions, and specifications are given along with complete electrode description and analysis. *General Electric Co.*

**For free copy circle No. 10 on postcard, p. 129**

### Power carriers

Power transmission equipment, including flexible couplings, variable speed pulleys and transmissions, universal joints and motor bases, is described in a new 12-page illustrated technical brochure. Information includes operating data, horsepower ratings, sizes and types for countless applications and widely varying working conditions. *Lovejoy Flexible Coupling Co.*

**For free copy circle No. 11 on postcard, p. 129**


## Advances in Applied Radiation

DEVELOPMENTS in APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT

**Speeding production radiography** of small castings having high nickel or cobalt content, the x-rays from a one-million-volt Van de Graaff permit clear observation of details in 1/32" and 5/8" thicknesses *in the same exposure*. Heretofore, inspection of such castings has required two x-ray units having different penetration characteristics so that each might be used for a specific region of the casting. But the balance of low- and high-energy components, inherent in the Van de Graaff constant-potential x-ray beam, makes possible a simplified, economical technique. Moreover, the radiographs obtainable with the Van de Graaff are easier to interpret than those made with lower-voltage x-rays because the large grain-size of the high-temperature alloys produces a diffraction pattern with lower-voltage x-rays.

Typical precision castings whose inspection is speeded by million-volt Van de Graaff radiography.

Other examples of advantages gained with the Van de Graaff are given in our 24-page Bulletin R, which also gives full information on the equipment and its installation. *Write today for your free copy.*

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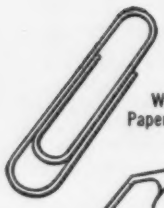
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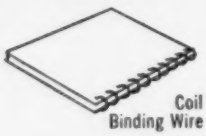
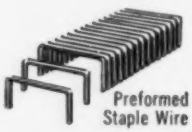

Coil Binding Wire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## FREE TECHNICAL LITERATURE

### Magnetic motor starter

Several new features have been incorporated into a bulletin describing a magnetic motor starter. Still retaining past features, the bulletin now lists improved pressure type terminals; a snap-on contact block cover which locks into place and yet provides for instantaneous inspection and contact servicing; an exclusive visual or audible alarm circuit; and a new plastic-covered coil insulation, vacuum impregnated and standard in three colors. *Cutler-Hammer, Inc.*

**For free copy circle No. 12 on postcard, p. 129**

### Moly steels

Four-page booklet explains advantages of molybdenum alloys which permit reduction is size and weight of cast-steel gears. Booklet says that of thousands of cast-steel gears made daily, increasing numbers are being made of alloy steels. This is said to be because alloying elements increase the metal hardenability, making possible higher strength and toughness in moderate and large size gears than can be attained with carbon steel. *Climax Molybdenum Co.*

**For free copy circle No. 13 on postcard, p. 129**

### Paint preparation

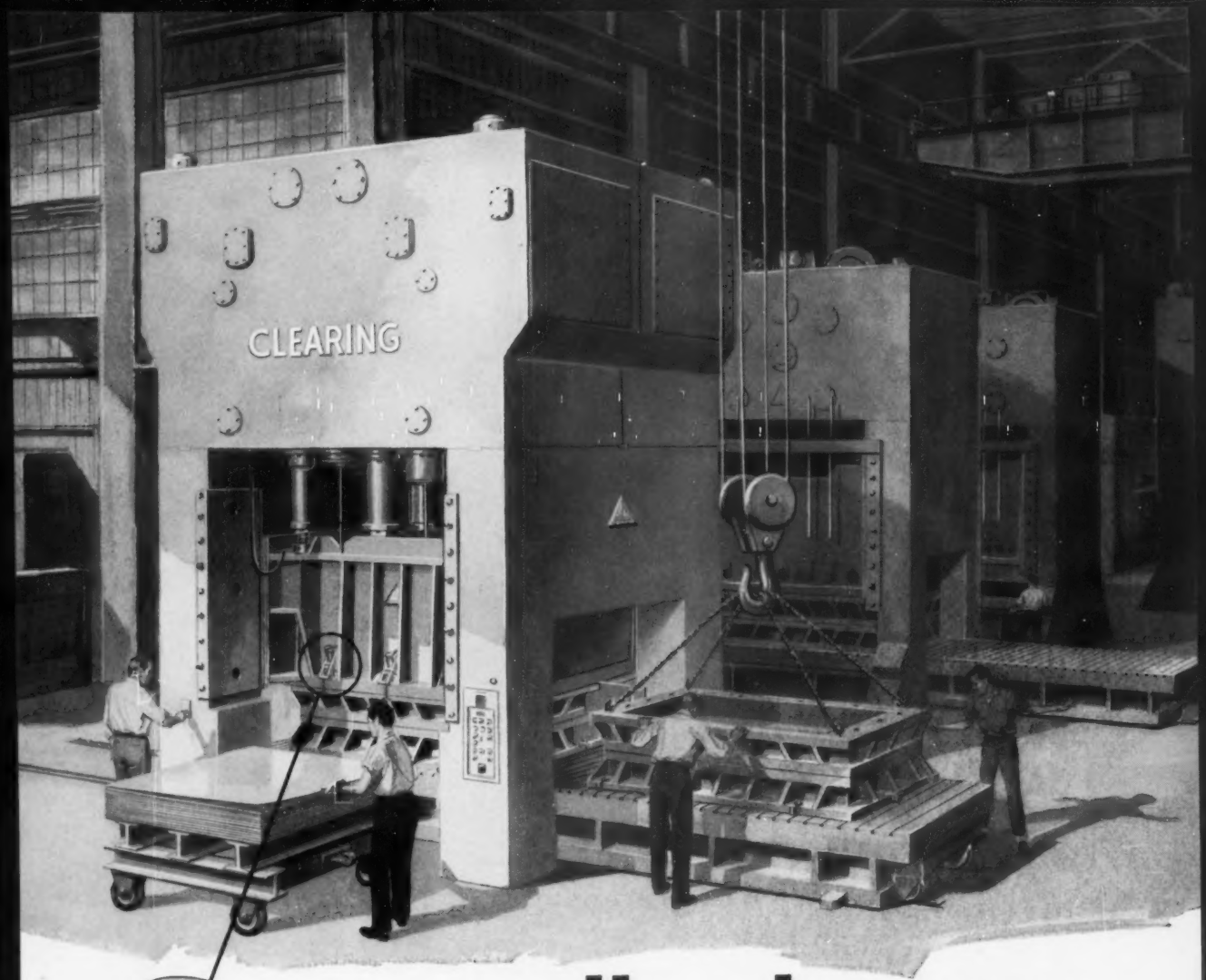
How to prepare metals for painting is the subject of an illustrated folder. It gives information on paint strippers, rust removers, metal conditioners and metal cleaners—both alkaline and emulsion. Folder contains operating charts for metal working companies and job paint shops. A photographic case history describes ability of material to clean and phosphate in one operation. *Wyandotte Chemicals Corp.*

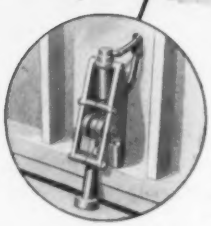
**For free copy circle No. 14 on postcard, p. 129**

### Roller chain

Precision roller chain and sprockets are described in 148-page book. It includes sections on stock drives, drive chain, conveyor chain, installation and maintenance, lubrication, sprocket wheels, casings, and chain tighteners, among others. Thoroughly illustrated, book gives advice on choosing roller chain for a given application. *Link-Belt Co.*

**For free copy circle No. 15 on postcard, p. 129**



Hydraulic clamps like this one make it possible to clamp the dies to the slide in a matter of seconds.

# die changes *IN MINUTES*

## CLEARING Moving Bolster Press offers "PUSH BUTTON" DIE SETTING

You can eliminate hours of non-productive time with the new Clearing moving bolster press shown here. This press has two bolsters—one under the press slide, the other, as shown above, is outside of the die area. The press is set up for its new production run on the outside bolster before the current job is completed. When the run is complete, a button is pushed and the outside bolster rolls into operating position under the press slide.

Quick change hydraulically operated, mechanical locks (inset) make detaching the old dies from the press slide as easy *and faster* than winding your watch. Locking in the new dies is, of course, just as simple.

"Push button" die setting is one of the many methods Clearing has developed to help you produce more profitably. A Clearing sales engineer will be glad to discuss them with you at your convenience.

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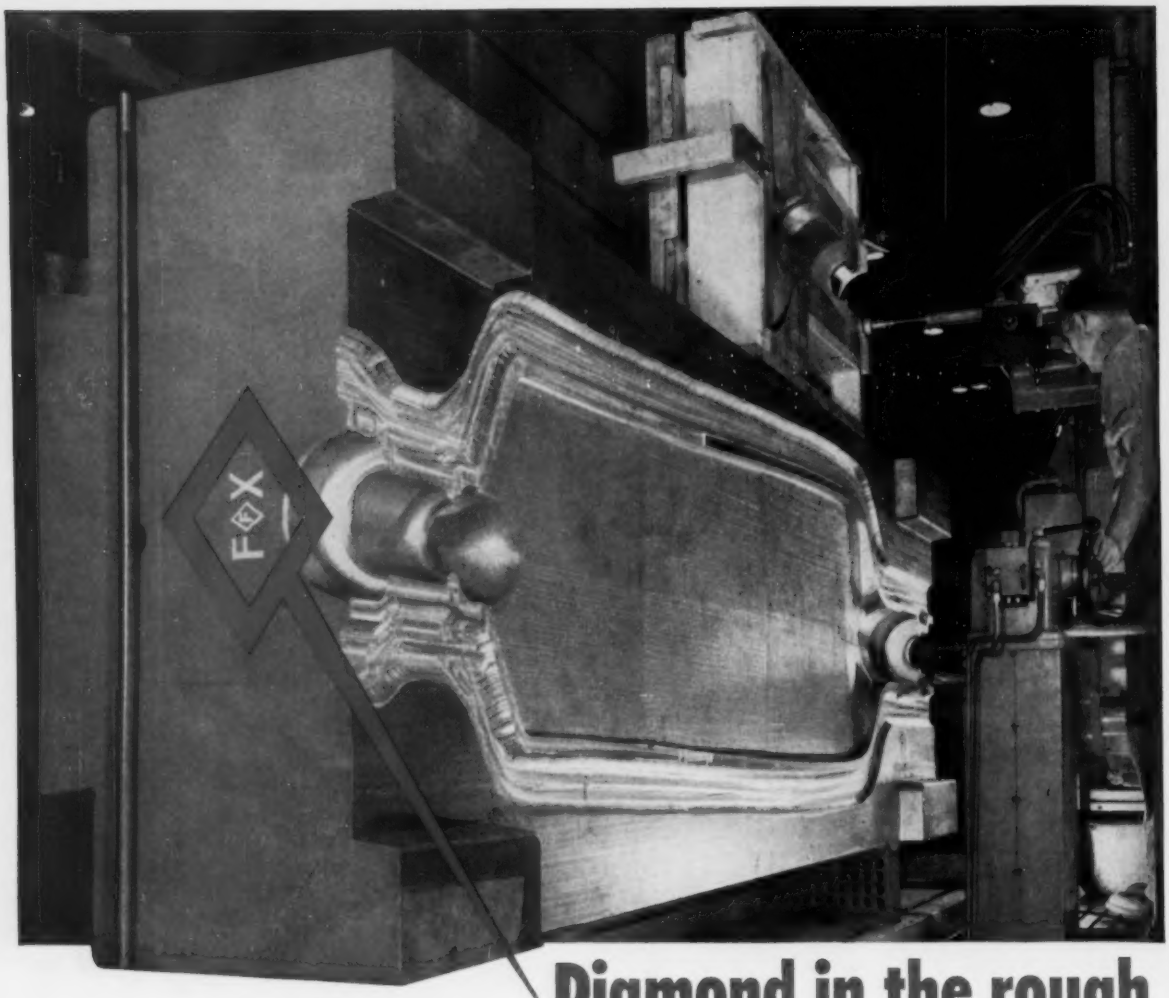


# Diamond in the rough

This 42,000 pound Finkl FX die nearing completion at the Ladish Co., Cudahy, Wisconsin, will be utilized by that firm in drop forging 1681 pound close tolerance aircraft propeller blades. FX is but one of many Finkl steels available for forging operations, all of which are quality controlled with "built-in" characteristics required for precision production. For the proper die steels to fit your needs, ask your local Finkl representative or write for the Finkl catalog.

When you next consider hot work tooling, die blocks, or forgings, call on Finkl for "impressions that last."

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HOT WORK STEEL
•
FORGINGS
•
ELECTRIC FURNACE STEELS

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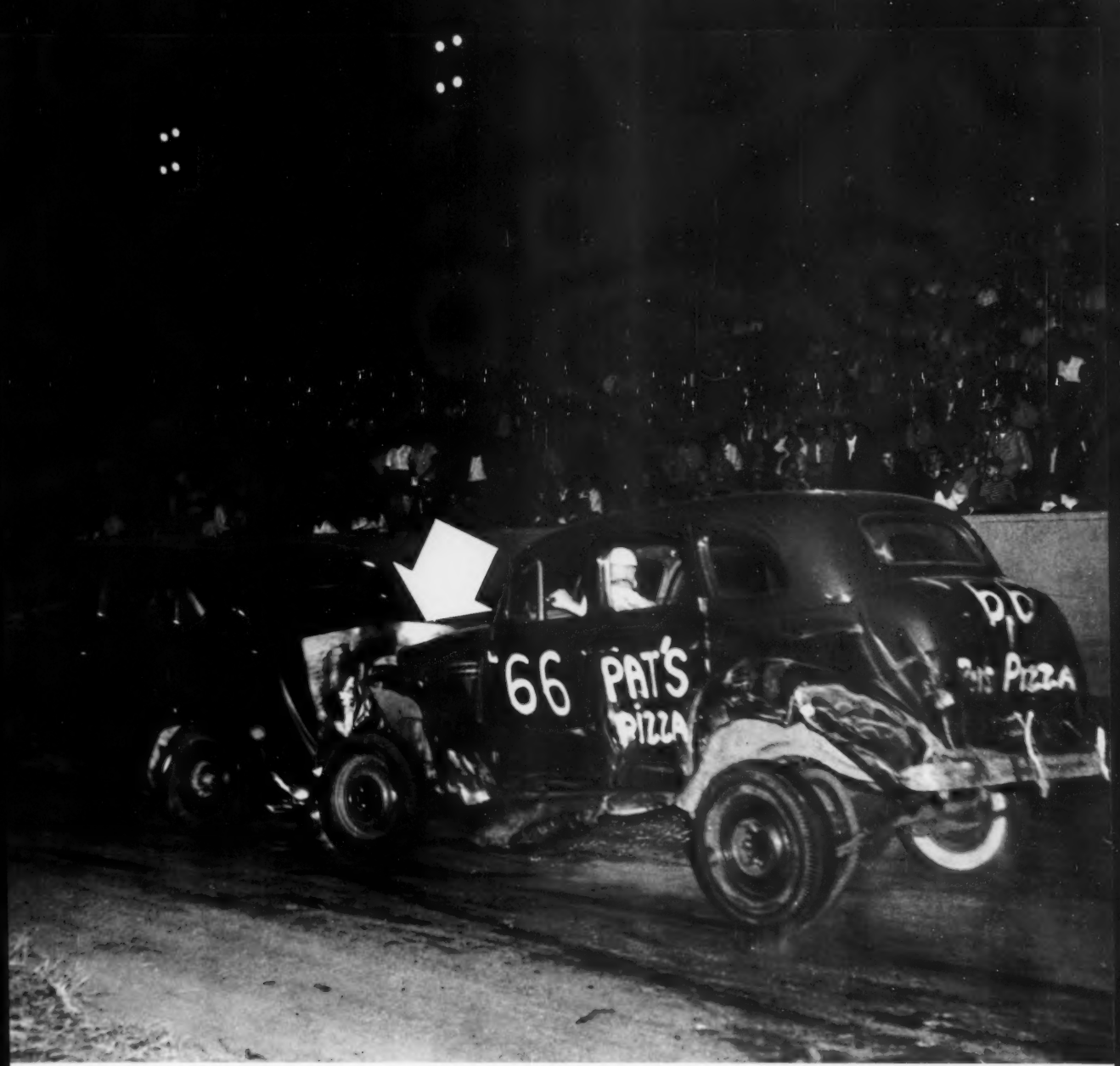
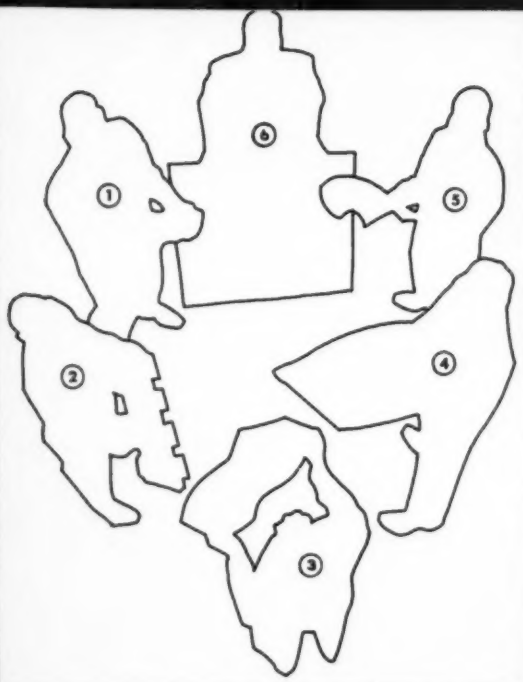



# GRUELING DEMOLITION CONTEST FAILS TO FLAKE TI-CO!

**STOCK CAR DRIVER** inspects sheet of Ti-Co after battering in demolition race. No trace of coating failure could be found.

The brutal "demolition race" is one of the top crowd-pleasers in stock car racing. Each driver is bent on smashing his opponents out of the race . . . last car still moving is the winner! This grueling automotive mayhem at Chicago's Soldier Field provided the setting for an unusual demonstration of the toughness of the zinc coating on Inland Ti-Co galvanized sheets. A sheet of Ti-Co was lashed to the rear of one of the doomed jalopies. Car after car rammed it head-on, at speeds up to 50 m.p.h. After half an hour of constant crashing, battering punishment, the car was finally ready for the junk heap . . . but the zinc coating on the Ti-Co sheet had stayed put! Closest examination revealed not a trace of coating failure anywhere.

This test is, to be sure, rather unusual . . . but the Ti-Co coating has survived even tougher tests without cracking, flaking or peeling. Turn the page for more facts about how Ti-Co can cut your manufacturing costs, improve your products and add greatly to their useful life.




Shown (at the left) are six typical severe forming jobs now being accomplished with Inland Ti-Co: (1) deep-drawing, (2) roll-forming, (3) Pittsburgh lock-seaming, (4) spin-drawing, (5) crimping, (6) perforating.

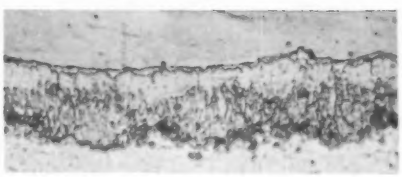
# INLAND TI-CO GALVANIZED SHEETS TAKE THE TOUGHEST FORMING OPERATIONS IN STRIDE

Any product that can be formed with steel can be formed with Inland Ti-Co. Ti-Co's ability to withstand even the most severe forming without cracking of the zinc coating makes possible many new galvanized steel products.

The zinc coating on Ti-Co is not only extemely tough but has just enough pliability to actually flow with the base metal as it's formed. Both on the production line and in extended usage, the Ti-Co coating has proved its ability to withstand punishment without leaving the slightest opening for rust to get a foothold. Unlike the conventional galvanized, products made from Ti-Co do not require re-dipping or "touch-ups" after fabricating, and rejects are greatly minimized. Ti-Co products can be depended upon for long service.

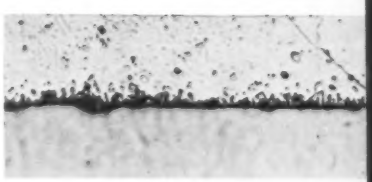
# THE SECRET OF INLAND'S NON-FLAKING TI-CO

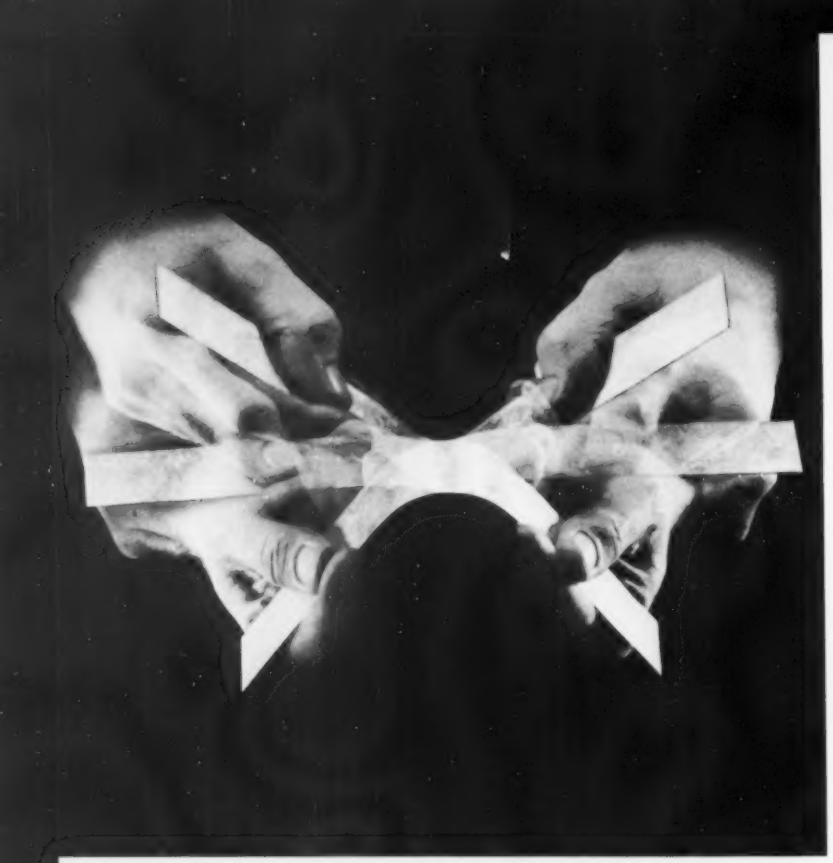
Inland Ti-Co galvanized steel is made by the patented Sendzimir process, a continuous operation in which the heat treatment of the strip and the application of the zinc coating are performed in one continuous galvanizing line. This process eliminates the brittle iron-zinc alloy layer, that causes flaking in conventional galvanized sheets, and results in production of a sheet on which the zinc adheres so tightly that it can be severely formed without flaking of the coating.



Photomicrograph reveals hard, brittle iron-zinc alloy layers which cause flaking in conventional galvanized steel.

Alloy layers are virtually eliminated in galvanized sheets made by the Ti-Co continuous process of galvanizing.



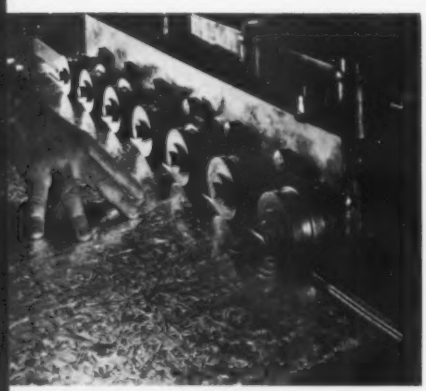


# WHY YOU CAN BE SURE OF TI-CO'S QUALITY

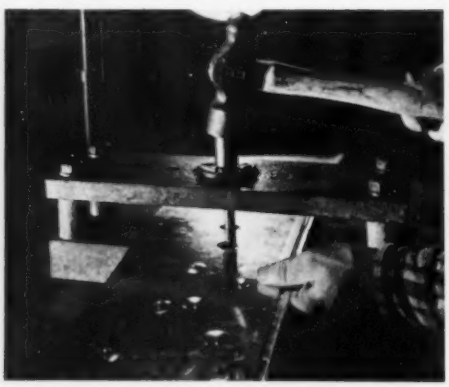
Samples from every order of Ti-Co are put through a series of tests far more severe than ever demanded of a galvanized sheet in normal fabrication.

In addition to the coating tests shown below, the Ti-Co quality control routine includes the following tests: Olson Cup test for ductility; Rockwell Hardness test; Weight for Coating test for uniformity; Fluting test of resistance to cross-breaking; Microstructure test for tightness of coating.

**HOW YOU CAN TEST TI-CO.** Take a piece of the galvanized steel you are now using and bend it back and forward on itself several times. If the coating flakes or peels, it's *not* Ti-Co. For a free sample of Ti-Co to use in making your own "bend test" comparison, please write to Department 297.



**LOCK SEAM TEST.** The tough 180° bend of a Pittsburgh lock seam is a supreme test of fabricating qualities. Ti-Co takes it!



**IMPACT TEST.** Rounded punch hammered into Ti-Co sheet dents the steel. But the Ti-Co coating "gives" without cracking.

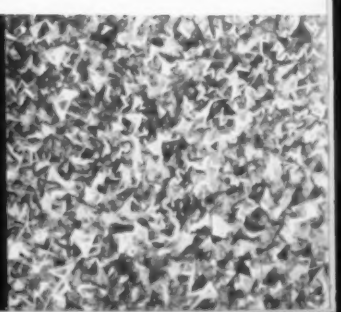
**BEND TEST.** Hammered flat to a 180° bend, the Ti-Co coating shows no sign of cracking or flaking after repeated pounding.

## INLAND STEEL COMPANY

*38 South Dearborn Street • Chicago 3, Illinois*

*Sales Offices: Chicago • Milwaukee • St. Paul • Davenport St. Louis • Kansas City • Indianapolis • Detroit • New York*

INLAND TI-CO ®



# FREE TECHNICAL LITERATURE

**These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.**

**This section starts on p. 124**

## Unbalance correction

Machines for detecting and correcting unbalance in rotating parts on the production line are described in 12-page booklet. Complete description, illustrations of its use, and specifications are given of a new Vibrodyne device that allows pinpointing and removal of vibration caused by unbalance at normal operating speeds from 225 to 3600 rpm. With rugged carryall case, stroboscopic light, cords and connectors, the unit comes to only 32 lb. Any standard outlet supplying 110v, 60 cycle single phase current will accommodate the 20 ft cord. *Tinius Olsen Testing Mach. Co.*

**For free copy circle No. 16 on postcard, p. 129**

## Vibration reducer

Graphically illustrated booklets describe company's line of vibration absorbers. Stopping up to 85 pct of transmitted vibration, machine mounting material is said to: increase machine life; reduce noise, cut installation time by eliminating bolts, lag screws, drilling and floor patching. Literature says they have been proved on 600,000 machines of all sizes in all types of plants, but says a particular line is especially suited for precision machines. *The Felters Co.*

**For free copy circle No. 17 on postcard, p. 129**

## Pallet dollies

Bulletin provides information on pallet dollies' models, sizes, load capacities, construction features and other pertinent data. Dollies are of magnesium construction, and according to the company, a man can easily carry one under each arm. Fourteen standard sizes are available. *Magline, Inc.*

**For free copy circle No. 18 on postcard, p. 129**

## Wrought iron pipe

Colorful 16-page booklet, "Wrought Iron Pipe for Modern Buildings," is available. It identifies wrought iron pipe and describes its composition and advantages. Included are sections on wrought iron's corrosion and fatigue stress resistance, weldability, forming and threading as well as the application of protective coatings to the material. Pictures and sketches illustrate applications. Cost and availability are reviewed. *A. M. Byers Co.*

**For free copy circle No. 19 on postcard, p. 129**

## Aluminum signs

Information on aluminum highway signs and railroad crossbucks has been published. It lists sizes and availabilities of various types of sign blanks, including octagon, round, rectangular, square and diamond shapes. New design features of firm's extruded highway signs and railroad crossbucks are described. Also included are methods of finishing aluminum sign panels by applying reflective sheeting, paint, baked enamel and porcelain enamel. *Kaiser Aluminum & Chemical Corp.*

**For free copy circle No. 20 on postcard, p. 129**

## Milling cutter design

Covering development of milling cutters which eliminate sharpening, "A New Dimension in Milling Cutter Design" is the title of a 6-page bulletin now available. The process is built around a new milling cutter which uses low cost "throw-away" type inserts which are indexed eight times and then discarded. Regrinding of carbide blades is eliminated by the design. *Wesson Co.*

**For free copy circle No. 21 on postcard, p. 129**



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## Kellering attachment

Copying of intricate forms in metal with a Kellering attachment is presented in a new folder. It describes tracer control for a standard milling machine for milling a three-dimensional form. Operating principle, reproduction, and attachment installation are given, along with its outstanding features. The latter are listed as: new unique type of tracer control, accurate reproduction, rigid cutter spindle, wide spindle speed range, dependability and relative simplicity. Specification breakdown is included. *Pratt & Whitney Co.*

**For free copy circle No. 22 on postcard, p. 129**

## Aluminum products

Producer's wrought aluminum mill products are presented in a new eight-page brochure. Illustrations and text describe extruded shapes, structurals, machining stock, drawn tube, forging stock, press forgings, impact extrusions, screw machine products, and heavy press extrusions. Concise data for engineers and designers are listed. Included are tables on extrusions, manufacturing limits, tolerances, properties and typical uses for aluminum alloys. *Harvey Aluminum.*

**For free copy circle No. 23 on postcard, p. 129**

## Metal cutter

Metal cutting with a portable hand or bench tool is briefly explained in a new circular. Tool cuts through 14 gauge steel of all types without distortion, it states. It is described as powerful, accurate and versatile. It may be used for cutting holes in tubes and ducts where it is necessary to retain original contour. Weighs 8½ lb, overall length is 10 in. It has a ⅞ in. minimum cutting radius. *Fenway Machine Co., Inc.*

**For free copy circle No. 24 on postcard, p. 129**

## Pipe, valves, fittings

Eight page engineering memorandum on polyvinyl chloride pipe, valves and fittings covers corrosion resistance, general properties, fabricating characteristics and economies. *Peter A. Frasse & Co., Inc.*

**For free copy circle No. 25 on postcard, p. 129**

## Punch presses

Folder showing company's line of open throat punch presses has been prepared. It gives complete run-down on air clutch, ram guides, gears, bearings, knockout attachment, frame and ram. Standard equipment, including press with two in. stroke, 10 in. shut die height to bed; remote control foot switch; bolster plate; motor drive arrangement (less motor) and more, is explained. Optional equipment is also listed. Complete specifications sheet is included. *Diamond Machine Tool Co.*

**For free copy circle No. 26 on postcard, p. 129**

## Heat treating beryllium

Methods and procedures used to heat treat beryllium copper wrought and casting alloys appear in this eight page catalog. Divided into two sections, the first covers wrought alloys. This tells how they are supplied and describes both standard and special methods of heat treat hardening. Information is also included on fixtures, furnaces, annealing methods, cleaning and brightening. The cast alloy section describes the various alloys available in ingot form for customer re-melt. Complete tables of physical and engineering properties of various alloys are also included along with data on melting, heat treating, special heat treating, furnaces and annealing. *Beryllium Corp.*

**For free copy circle No. 27 on postcard, p. 129**

## Shell molding

Describing resin-coated sand as more efficient than conventional resin-sand mixes, this 16-page booklet lists several advantages. These include elimination of dusting, improved mix flowability, excellent blowability, resin economy, reduction or elimination of need for pattern lubrication and non-segregation of resin and sand during storage and handling. Booklet discusses resins, sands, equipment, coating techniques and the production of blown shell molds and shell cores. A section on trouble-shooting shell mold and core production is included. *Monsanto Chemical Co.*

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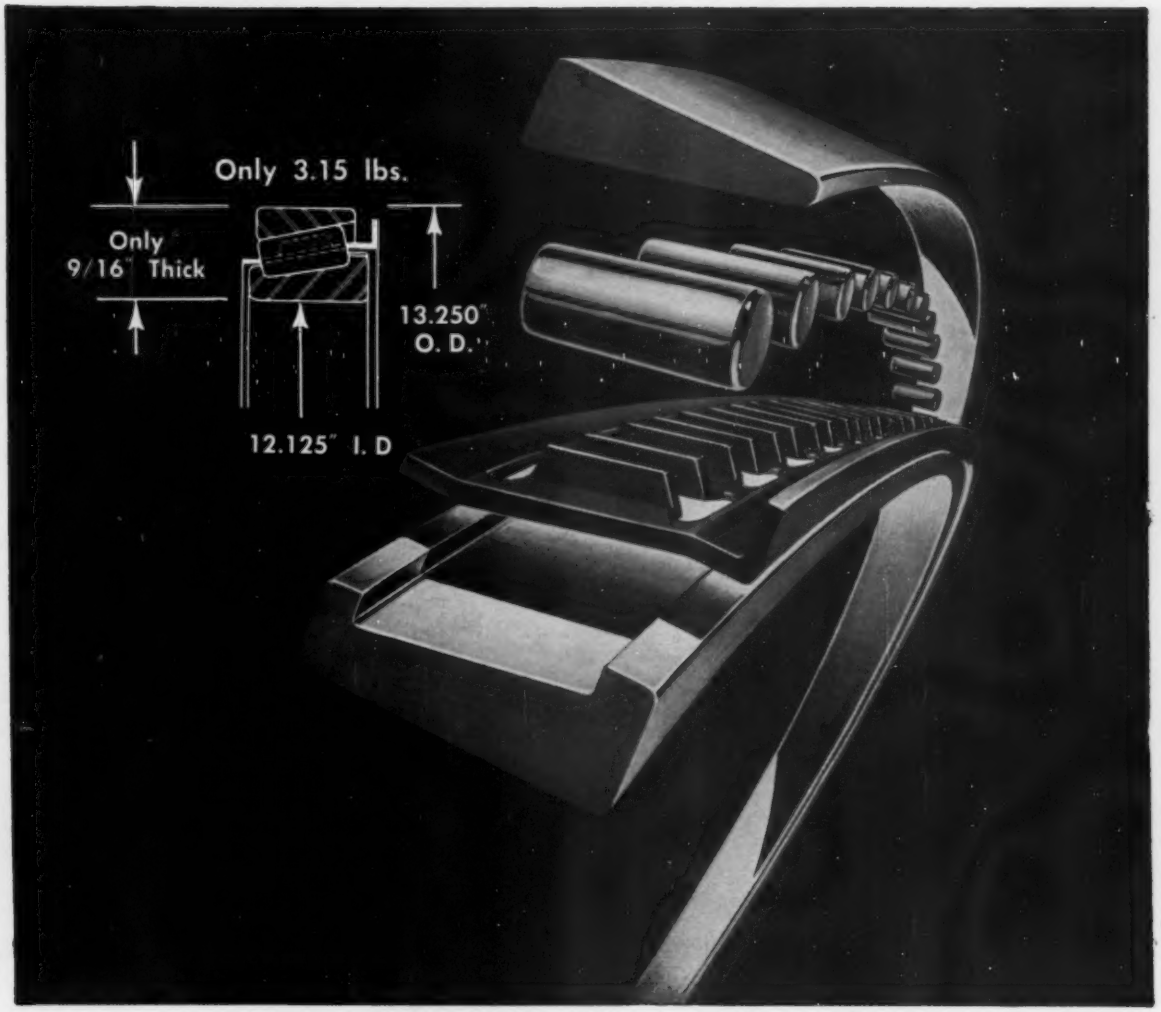


# Kaydon...
# world's thinnest tapered roller bearings

*Reali-Slim* — that's the name we've given our line of extremely thin-section, lightweight bearings. The bearing shown above is a *Reali-Slim*. *Reali-Slim* bearings are really strong, too! The single row, tapered roller bearing we're talking about, here, has a 33,000-lb. radial capacity—with 38,200-lb. thrust capacity. Over 1-ft. in diameter, yet it weighs only 3.15 lbs! These figures tell how *Reali-Slim* bearings combine minimum section with high strength and long life.

If you're looking for a whole new concept in thin-section, lightweight bearing design — look at Kaydon's *Reali-Slim* line. In addition to hundreds of *Reali-Slim* standard sizes, there's a big variety of special races and separators to meet special applications. Kaydon engineers are prepared to give you valuable help with your application problems.

For more information write Kaydon of Muskegon. Ask for engineering Catalog No. 54RS-1 detailing:

★ ***Reali-Slim Ball Bearings*** — in Conrad, angular contact and 4-point contact types are available in seven standard cross sections from ¼" to 1.000" and in bore diameters from 4" to 40.000".

★ ***Reali-Slim Roller Bearings*** — in radial and taper roller types are available in cross sections from 9/16" and in bore diameters from 5" to 40.000".

K-552

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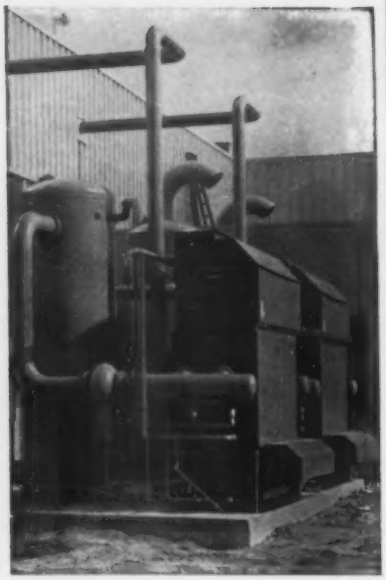

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THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient.

Drier air gives you better operation and lower costs in using all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years.

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# HANDLING: Railporter Hauler

**Resembling a conventional mining car, new carrier operates on a single rail . . . Carries material virtually anywhere . . . Two men lay 100 ft of track in 20 minutes.**

Said to be completely different in idea and method of operation, the Railporter, a new product from Chain Belt Co., Milwaukee, Wis., is reported able to go anywhere on its single rail. A portable transport for construction materials, it is loaded at the point of supply and sent on its way by engaging a clutch lever. It follows the rail unattended to its destination where it stops automatically. Workers discharge the hopper, engage the clutch and the unit returns automatically to the loading point.

**Handy, rugged rail carrier can haul and pour almost anything.**

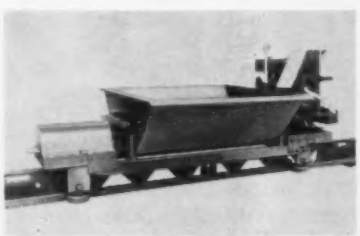
The Railporter, resembling a conventional mining railroad car in appearance, but unlike any other rail-type car that runs on the ground, operates on a single, portable rail. According to the manufacturer, 100 ft of rail can be easily laid by two men in less than twenty minutes and it can be set up to operate over any terrain including mud, open cuts, excavations, reinforcements, water or at elevations.

The vehicle maintains stability and safety on the single rail by means of rollers which ride sides of the rail. Automatic stops are accomplished by setting a stop-bolt through the rail where a stop is desired. The stop-bolt automatically trips the Railporter clutch as the unit passes over it, and a brake is automatically actuated.

The rail, on which it runs, consists of single four, six or 12 ft sections that are supported at each joint by adjustable stands. A slip-pin connection joins the rail sections in seconds. Switches and curved rail are also available.

### Spans Open Cuts

It is said to easily span open cuts, excavations, reinforcements, mud or water. The manufacturer claims it saves time and keeps work on schedule under any condition and eliminates the need for wooden runways and ramps. It is self-propelled and operates with one clutch lever for forward and reverse. It is



**Railporter hopper has a carrying capacity of 1400 lb.**

### WANT MORE DATA?

***You may secure additional information on any item briefed in this section by using the reply card on page 129. Just indicate the page on which it appears. Be sure to note exactly the information wanted.***

said to handle both big and small jobs alike. It carries liquids, bulk, package, block and other materials.

The hopper has a carrying capacity of 1400 lb, or 13 cu ft liquid level. Unit travels at a speed in excess of 300 fpm in either direction. Power is supplied by a six hp air-cooled gasoline engine. A trailer unit identical to the power unit, but without engine and gearbox, may be coupled to the power unit to double carrying capacity.

## Metals:

### Tiny perfect iron crystals take 1,900,000 lb psi

A new "world record" for the strength of metals has been established by metallurgists at the General Electric Research Laboratory, Schenectady, N. Y.

Recent modifications of GE's methods of making "perfect" iron crystals have produced tiny whiskers with tensile strengths as high as 1,900,000 lb. psi.

This strength is more than 150 times that of ordinary iron crystals and four times that of the strongest steel wire, company says. (Tensile strength, also known as ultimate strength, is a relation between the maximum load the material can support and the cross-sectional area of the test sample.)

#### Not Practical Now

Although present perfect crystals are too small to be practical, recent studies have shown that there is a possibility that we will be able to make large crystals free of defects—and thus equally strong.

"Crystal-ball gazers, including some leading scientists, have based many of their prophecies for the future—for aircraft, rockets, skyscrapers, everything made of metal—on the hope that such superstrong materials could be made," said Dr. J. H. Hollomon, a GE spokesman. "The day of the wire-like girder and the indestructible automobile is a long way off, but the recent work of our group shows that it may someday come."

General Electric scientists first announced two years ago that they

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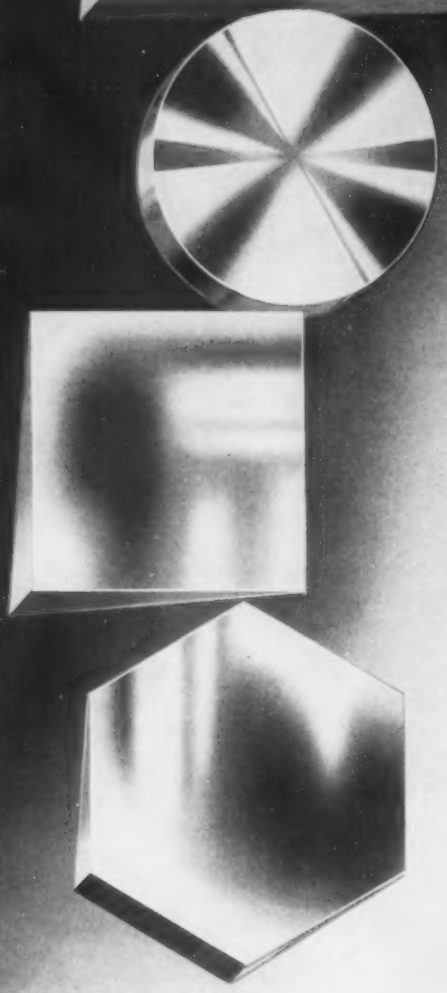

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had made extremely strong iron whiskers. Subsequently the methods of growing the whiskers have been adapted to a variety of other metals, including gold, silver, platinum, nickel, and copper. Copper crystals have been made with tensile strengths of 600,000 lb., psi, 20 times as strong as ordinary annealed copper.

The newest iron crystals, less than an in. long and not as big around as a human hair, have nearly twice the strength of earlier laboratory-made materials.

"Metals are ordinarily from 10 to 1000 times weaker than they

**Perfect iron crystal is tiny but offers up to 1,900,000 lb psi.**

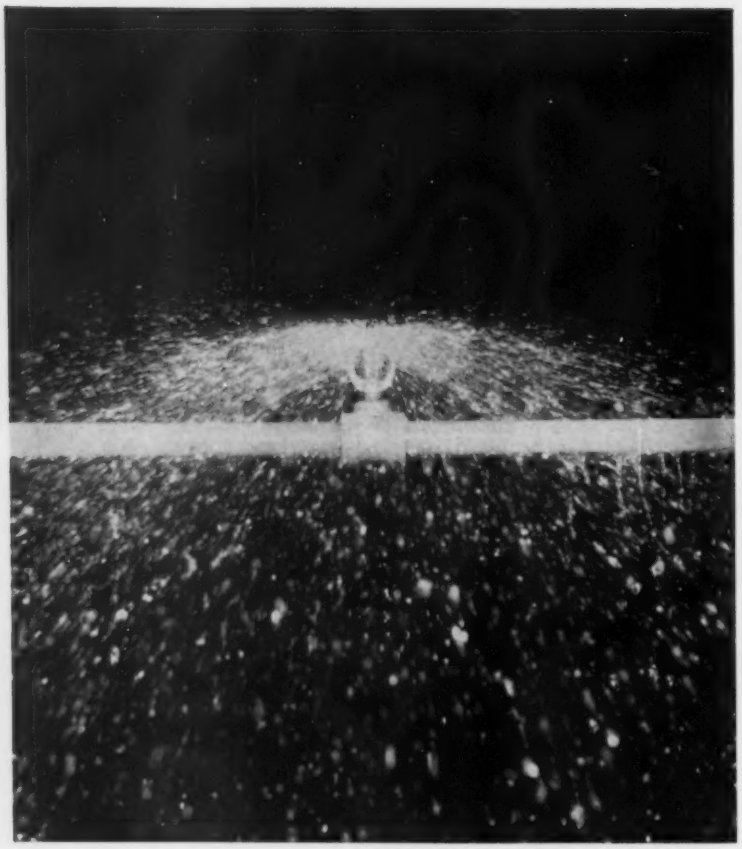
theoretically should be," Hollomon said. "This is due to imperfections in the crystals that constitute their basic structure. In the so-called perfect crystals, imperfections are almost eliminated, and metals achieve strengths approaching those indicated by theory."

## Methods:

### Metal cable trough has many assets

Metal cable trough is economical, simple to design and install, saves space, and offers other advantages that for many installations make it the most suitable support for power and control cables. Burns and Roe, Inc. reports that they have worked with cable trough for more than ten years with much satisfaction.

For some applications, conduit still remains the best system of support, the company admits.



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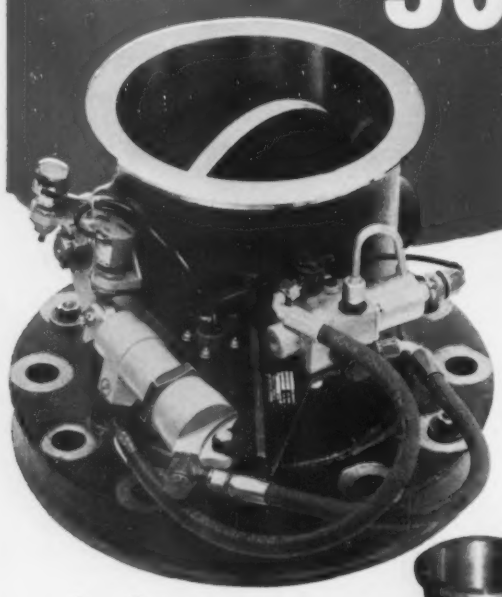
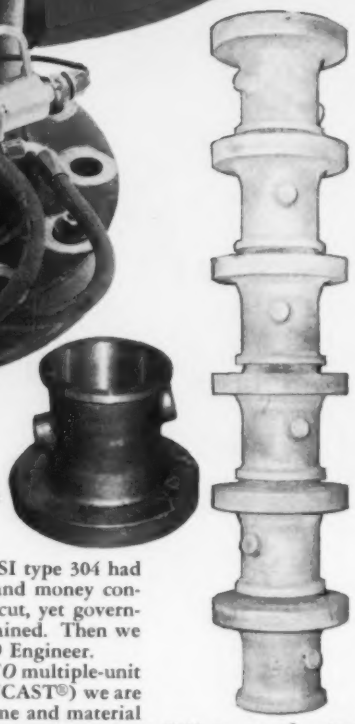


...in the cost of producing guided missile components"



"Heavy butterfly valve bodies of AISI type 304 had previously been fabricated, a time and money consuming operation. Costs had to be cut, yet government specifications had to be maintained. Then we discussed our problem with an *ESCO* Engineer.

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They continue to use it in about 10 pct of their work. Expanded metal trough, however, is used in preference to solid types because it is less costly, allows a higher cable rating, and it does not collect as much dust. Trough has standard fittings for elbows, risers, drop-outs, etc.

### Engineer's Viewpoint

"Engineers who design new distribution systems find that trough is easier to work with than conduit," according to Joseph Becher, Assistant Chief Electrical Engineer at Burns & Roe. With conduit, every connector, drop-out, new line, etc. must be designed in advance, he says. Changes during installation are usually awkward and often costly. Trough installations are said to be more flexible, as it can be cut and standard fittings inserted in straight runs to permit late alterations.

Trough is reported to simplify use of space near walls and ceilings. During construction, generating stations are usually crowded. Access to several areas is generally more difficult to arrange than to one. Since trough saves space, it is particularly applicable here. Cable installation is much faster and this minimizes confusion and crowded conditions, Becher reports.

Space becomes more important when cuts must be made through walls or floors and when approaching control panels. Here trough is considered advantageous.

### Operator's Opinion

Trough advantages over conduit should be immediately apparent to the engineer's client in that the trough system is both easier to design and install than the conduit system, observers believe.

A trough system could possibly be installed in less than half the time required for conduit of equivalent capacity. Probably the savings in installing the cables are even greater, as cable is sim-

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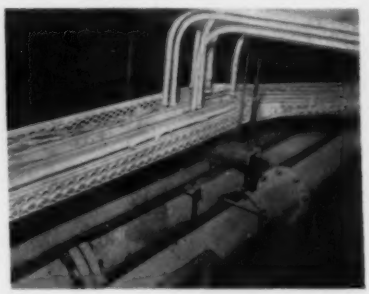
ply laid in place. However, Burns & Roe estimate a saving of about 25 pct in installation.

Becher admits there are differences among trough systems, too. Older types require nuts, bolts, and washers for each connection, i. e., the old Cope system required 50 pieces for each connection of 24-in. trough. Cope's series uses a pin-type coupling that secures the



**Either power or control cable drops into expanded trough.**

connection like a non-movable hinge. Fittings are welded to trough so that two pins and a bottom plate are only pieces needed for connection. Elimination of 47 pieces should reduce installation time.

A 10-ft run of 24-in. trough weighs 520 lb less than 10 ft of the equivalent capacity of 4-in. conduit. It is stated there is a saving of more than a ton of steel in every 40 ft of cable support when using trough.

## Machining:

### High speed hobber solves auto production problem

With an increasing number of buyers specifying full-time power steering on new automobiles built by Chrysler Corp., it became necessary to find ways of producing components at increased rates without sacrificing performance. Typical of this component production is the steering gear sector now being cut on a specially tooled hobber operating three times as fast as with previous methods.

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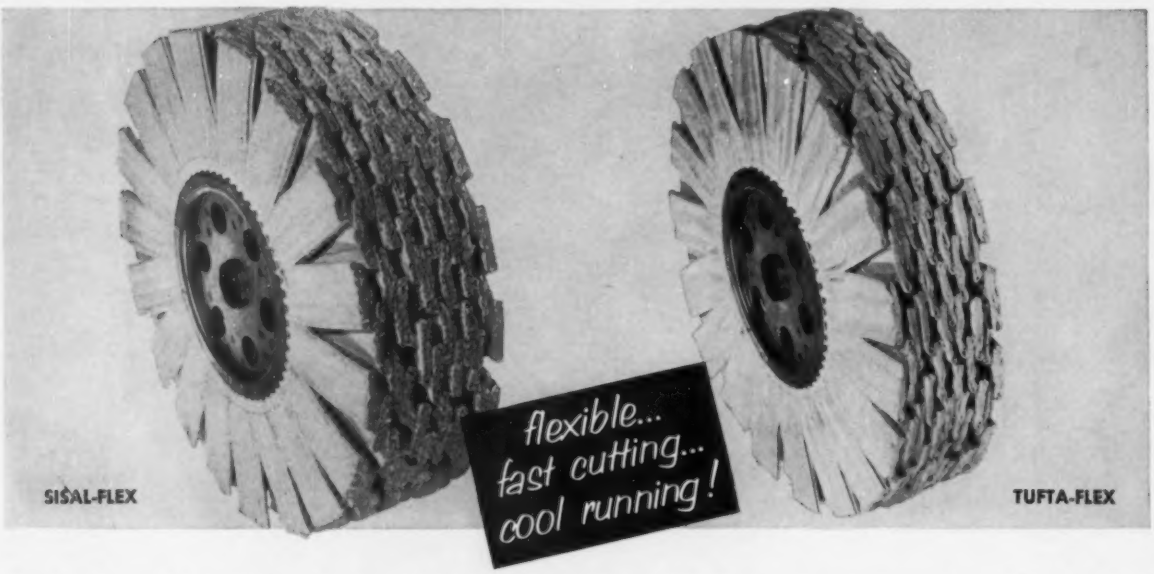


For fast, heavy-duty cutting on hard metal having contoured surfaces, choose flexible, strong, long-wearing new SISAL-FLEX Buffs! Overlapped SISAL-FLEX construction means cool running, no streaking, unusual pliancy. Check these features:

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- **Ventilated steel center, in 5", 7" and 9" dia. sizes. Note extra row of stitching around center.**
- ***Four rows of stitching*, for strength, longer wear.**
- **Also available with triple sewn buffing pads. Both types come in standard sizes from 12 to 18 inches in diameter.**

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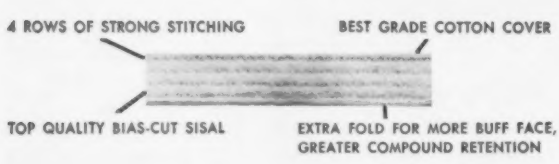
- **Two rows of stitching—super flexible! Extra row of stitching around center.**
- **Double fold provides greater cutting face, extra compound-holding capacity.**
- **Ventilated steel center has rugged clamping teeth for safety.**
- **Available in standard sizes from 12 to 18 inches in diameter.**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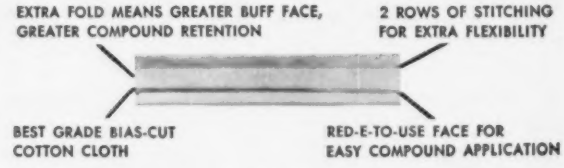
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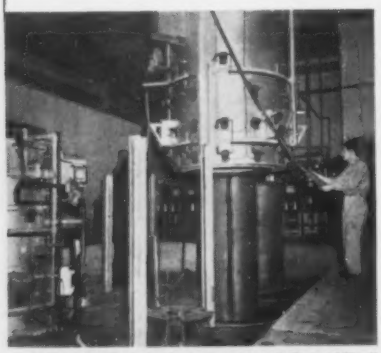

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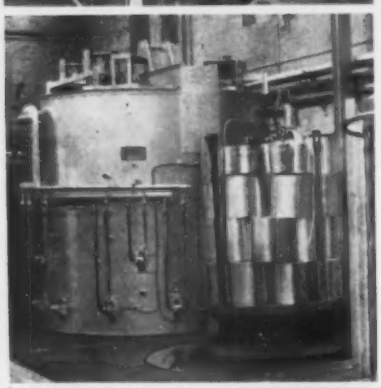

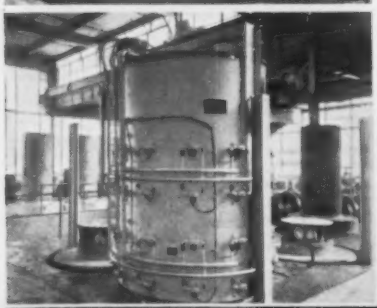

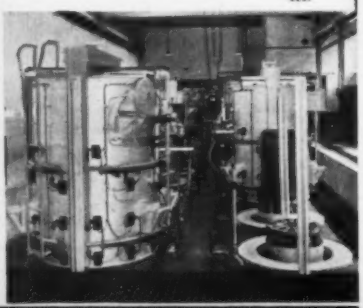

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FURNACES · PRODUCTION LINES · SPECIAL MACHINES · COMPLETE PLANTS

CONTINENTAL INDUSTRIAL ENGINEERS, INC.
176 West Adams Street, Chicago 3, Illinois



to withstand shock imposed when hob bites into metal after running free for a portion of each revolution. What was required in the set-up at Chrysler's Trenton, Mich., plant was a machine that would combine high production, a minimum of noise and pounding, good tool life and produce parts of the required accuracy for the shaving operation that follows.

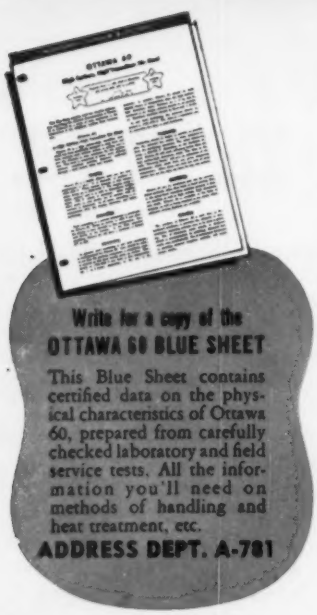
A modified model hobber produced by the Michigan Tool Co., feeds the hob across the work by a hydraulic cylinder mounted on the main head section. In addition, hob is fed at an angle to the axis of the part to produce the tapered teeth required.

To insure maximum production of satisfactory parts, the job depends to a considerable degree on

**Hobbing steering gear sectors is done with ultra speed hobber.**

positioning the forgings properly for the hobbing operation. Since there is no previous machining operation on the sides of the sector blank, there are variations in the rough forging. To overcome effect of these variations and to hold part securely during machining, Michigan tool engineers developed a collet type holding and aligning fixture. All operator has to do is place part in fixture and depress push-button to move hydraulic tailstock into clamping position. Hydraulically actuated tailstock maintains pressure on part during operation. This pressure also operates collet type clamping fixture, assuring part will be held securely during machining.

Hourly production rate realized is 45 hobbed steering gear sectors per hr.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OTTAWA 60 BLUE SHEET
This Blue Sheet contains certified data on the physical characteristics of Ottawa 60, prepared from carefully checked laboratory and field service tests. All the information you'll need on methods of handling and heat treatment, etc.
ADDRESS DEPT. A-781

OTTAWA 60 is a *new* die steel, an A-L "original," developed primarily to deep draw and form stainless steel. As intended, it performs without galling or pickup and shows exceptional wear resistance in that service. We have plenty of case histories to show you in proof.

But *wherever* you use Ottawa 60 draw dies—not just on stainless steel—this high-carbon, high-vanadium alloy comes through for you. Illustrated above are the first and second draws on transformer housings, produced from .037″ gauge SAE 1010 strip. The company formerly used dies made of 5% chrome air-hardening die steel—and later a more highly alloyed material—without ever getting more than about 2000 pieces before the dies began to show gall marks and pickup, and parts were rejected due to scoring, breakage and oversize. *Dies made from Ottawa 60 forgings cured that! Results after 25,000 pieces showed no pickup and no wear on punch or die.*

● You can solve many a problem and save real money with Ottawa 60 draw dies! Write for information or call in our Field Service Staff to help you get started. ***Allegheny Ludlum Steel Corporation, Oliver Bulding, Pittsburgh 22, Pa.***

For complete **MODERN** Tooling, call

# Allegheny Ludlum

WAD 8463

AL® FINE TOOL STEELS SINCE 1854

**Q.** *Which steel shot provides*
FASTEST CLEANING
+ LOWEST SHOT CONSUMPTION
+ LOWEST EQUIPMENT MAINTENANCE
= *Lowest Cost Cleaning*

**A.**
**WHEELABRATOR®**
STEEL SHOT

Wheelabrator Steel Shot is the only shot that gives you all the qualities vital to lowest COST cleaning and peening. Its high hardness gives super cleaning speed. Its toughness gives extra long life for minimum shot consumption and low maintenance costs. Wheelabrator Steel Shot has so proved itself that it now outsells all other steel abrasives combined. It outsells because it outperforms. Try it today. It's the low-cost answer to your cleaning problems. Write for your copy of Catalog 89-C.

**Now available in new S.A.E. size S-280 shot**

**WHEELABRATOR**
CORPORATION

510 S. Byrkit Street Mishawaka, Indiana



## Chemicals:

### Polyethylene pillows float and stop evaporation

Designed to retard evaporation of liquids in open tanks and vessels up to 70 pct, and thus greatly increase service life of the solutions, these polyethylene pillows have been announced by the American Agile Corporation, Maple Heights (Cleveland), Ohio.

The pillows are, in essence, small floating tank covers, and because

**A layer of these small pillows 1½ in. thick slows evaporation.**

they are made of polyethylene, offer excellent chemical resistance to a large variety of industrial solutions. They may be used in conjunction with such liquids as nickel and chrome solutions, solvents at room temperatures, reagents, and water.

A 1½ in. thick layer of pillows is said to be sufficient to retard evaporation.

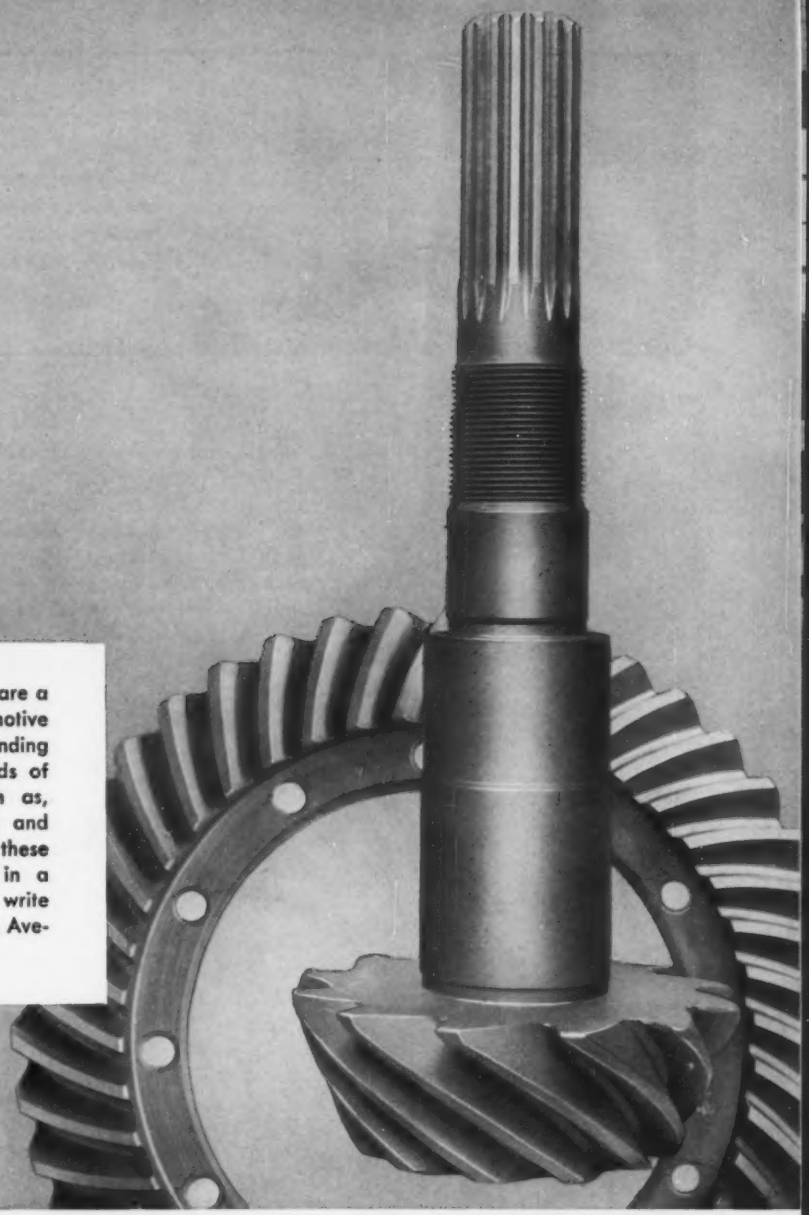
## Atomic Energy:

### Nuclear standards board created by ASA

Nationally coordinated standards in the field of nuclear energy are being hailed as assured. The American Standards Assn's Standards Council has voted to create a nuclear energy standards board within ASA.

It was declared that there is an urgent need for such a program. Many state regulatory bodies are already developing legislation to protect public and industrial workers from the effects of radiation hazards, according to ASA.

"IT'S BETTER IF IT CONTAINS MOLY"



**Moly carburizing steels** with 0.5% Mo are a natural for components like this automotive ring-gear and pinion. They have outstanding properties that suit them to the demands of gearing and similar applications, such as, superior case hardness, low distortion and good machinability. Many features of these new carburizing steels are discussed in a recent technical article. For a reprint, write Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y., Dept. 2.

# Molybdenum Carburizing Steels

## MOLYBDENUM OFFERS THE ECONOMICAL KEY TO PERFORMANCE

Over the years, molybdenum carburizing steels have proved their merits in scores of applications and at every level of production.

**Design engineers** know moly steels for their uniform hardenability, toughness and wear resistance.

**Production men** know that moly steels are easy to heat treat, easy to machine.

**Management** knows that moly steels mean economy in fabrication, high performance in a wide range of end products.

**Standard molybdenum carburizing steels are widely available. Higher moly analyses may be ordered in heat lots from a number of leading suppliers.**

**CLIMAX MOLYBDENUM**

Use the Moly Key to better carburizing steels

- High case hardness
- Wide choice of hardenability
- Easy to heat treat
- Low distortion
- Good machinability
- Good wear resistance

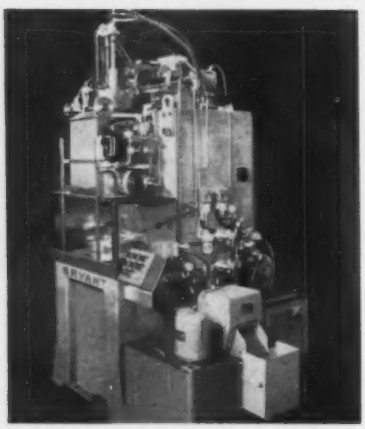
# NEW EQUIPMENT

**New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 129 or 130.**

## OBI press features extra throat depth

This simply designed 25-ton open back inclinable press is literally stripped for action. It combines all the versatility of an OBI press with 15 in. throat clearance (from ram center to frame) so that it can handle what its makers believe to be the broadest range of jobs found in any press of its size. It's semi-steel frame is heavily reinforced and extremely rugged to provide the necessary rigidity required in this type press. It has a roller bearing flywheel, extra heavy clutch that can be set for a single stroke or continuous operation, and bearings closely mounted to practically eliminate shaft deflection. Full-length V-type ram guides are precision ground to maintain true alignment. Manufacturer points out that in building simplicity has been stressed to facilitate operation and maintenance; also high precision machining assures uniform presswork. Firm says presses stand up under wear and stress. It is a real performer on the production line and will give years of satisfactory service, promises the press builders. According to the manufacturer this open back inclinable press is characteristic of the firm's reputation for making rugged machines. *Service Machine Co.*

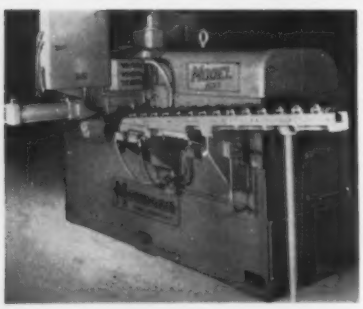
**For more data circle No. 29 on postcard, p. 129**




## Vertical version of new automatic grinder unveiled

Introduction of a special vertical version of firm's new automatic internal grinding machine has been announced. A vertical cam grinder, it incorporates principal features of the standard machine, such as greater rigidity and stability; faster stock removal and accuracy; workhead, wheelhead and longitudinal and cross slide motions of the wheelslide in one common plane, and vibration absorbers incorporated in the fabricated bed. Machine function is controlled by programming cam sets which can be readily intercharged. A simplified servo-control hydraulic system combining advantages of both cam and hydraulic machine operation gives accurate machine control and smooth operation. Work pieces are hand-loaded into a special chuck, rotating at 100 rpm. Increased rotation rate is said to be one of the underlying reasons for the vertical machine's greater production capacity. Stock removal is 0.015 in. to 0.020 in. *Bryant Chucking Grinder Co.*

**For more data circle No. 30 on postcard, p. 129**




## Machine does three operations in a single pass

Development of a machine capable of performing one, two or three operations on a workpiece in a single pass has been announced. It can roll a spline, or a spline plus an adjacent thread, oil groove, etc., in a single pass of the forming racks. A third operation such as marking can be added. Operations can be performed on same or different diam but forms to be rolled must be close together along length of shaft. This "chipless machining" is said to be up to 30 times faster than other methods. They come with automation or as manually loaded models. If the former, they need no operator. *Michigan Tool Co.*

**For more data circle No. 31 on postcard, p. 129**

*Another Example of*

**VICKERS®**

**HYDRAULICS**

***in Automation***

**Ex-Cell-O** Precision Cylinder Boring Machines shown below are finish-boring V-8 engine blocks. Like so many other high-production machines, these make generous use of hydraulics.

In addition to the advantages inherent in hydraulic control, Vickers Hydraulics gives you the benefits of a nation-wide company-operated field engineering and service organization to assure correct application and operation with least maintenance. Vickers has the complete line of hydraulic equipment necessary to take undivided system responsibility . . . to eliminate any risk of incompatibility of hydraulic components.

The Vickers Application Engineer near you will be glad to demonstrate the many benefits you can obtain by using Vickers Hydraulics. Write for a copy of Catalog 5002B.

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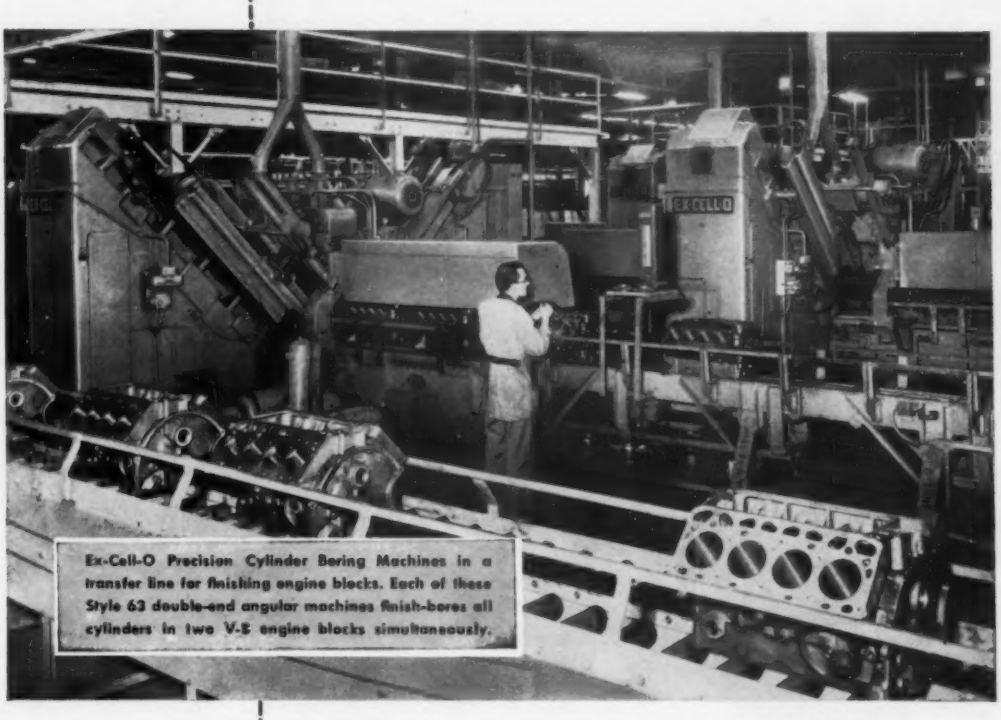
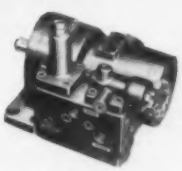
IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

*Engineers and Builders of Oil Hydraulic Equipment Since 1921*



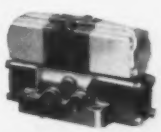

Ex-Cell-O Precision Cylinder Boring Machines in a transfer line for finishing engine blocks. Each of these Style 63 double-end angular machines finish-bores all cylinders in two V-8 engine blocks simultaneously.

**Representative VICKERS® Units Used on Ex-Cell-O Precision Cylinder Boring Machines**



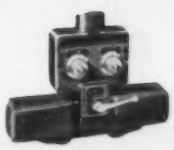
**Two-Pressure Pump**

Insures lower maintenance cost and saves horsepower and heat in two-pressure hydraulic circuit. Automatically provides high volume at low pressure and low volume at high pressure.



**Solenoid Controlled Pilot Operated 4-Way Valve**

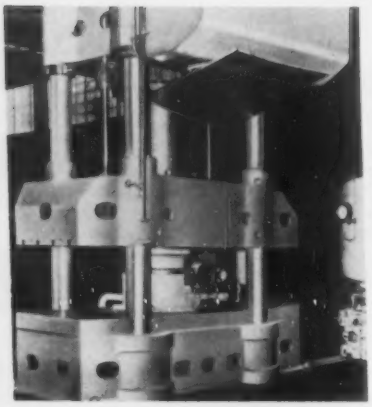
Compact and versatile "sandwich" construction. Gasket mounting simplifies installation and overhaul . . . also minimizes piping.



**Traverse and Feed Cycle Control Panel**

Maintains smooth and constant preset feed rate regardless of fluctuations in cutting tool resistance or hydraulic pressure.

7350



## Process package unit pads adaptable to any press

Adaptable to any conventional hydraulic press, these process package unit pads are readily interchangeable to meet specific pressure and blank size requirements. A typical package unit is installed in a large hydraulic press at an aircraft company. Designed for quick changeover, unit may be removed allowing press to be used for normal functions. The process is said to combine the economy of the rubber pad method of sheet metal forming with the deep-drawing ability of the steel die. It is recommended for forming parts where surface finish is critical and the shape is complex. Its advantages are described as: (1) Deeper possible draws, (2) Tooling cost reduced, (3) Uniform wall thickness, (4) plated or coated blanks may be drawn, (5) Exterior surfaces unmarred, (6) Tooling set-up time and changer reduced. *Lowey-Hydro Press Div., Baldwin-Lima-Hamilton Corp.*

For more data circle No. 32 on postcard, p. 129

## Instrument offers fast, accurate gas analysis

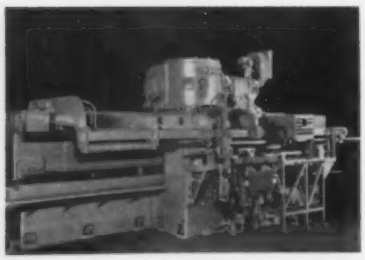
Introduction of a new instrument for gas and vapor-phase chromatography has been made. It offers fast and accurate analysis of gases or liquids, even liquids boiling up to 300°C, maker says. Small and more compact than previous models, it may be bench or panel mounted anywhere in the laboratory or in the plant for process control. Size is 24 high x 16 wide by 13 in. deep. A basic unit is recommended for routine analysis. Most compounds can be analyzed completely with fractions easily collected. Machine is designed to allow adding of accessories for analysis of complex mixtures. Sides of the small cabinet and a panel door open for accessibility to all components. Metal columns of various lengths may be used. Temperatures of both cell and columns are independently controlled and the finest detector cell is reported used. Cell is direct acting for sensitivity and quick response. *Burrell Corp.*

For more data circle No. 33 on postcard, p. 129

## Abrasive cutting machine handles up to 12 in. pipe

Pipe up to 12 in. may be cut on this abrasive cutting machine. This has been accomplished by raising the entire cutting head including motor mount, motor, wheel guard, etc., with a solid lift block. A longer vise chain is furnished to accommodate larger material. In cutting larger sizes, from 6 to 12 in. pipe, a 14 in. wheel is used and the pipe is turned. Small sizes of material may be "ganged" for still greater time saving. As in firm's standard machines, a 20 in. wheel is used for cutting small sized material. As the large wheels wear down, they are used to cut 6 in. and larger sizes. It will cut up to 12 in. pipe, six in. shapes, 2½ in. solid stock. Wheel speed is 2400 rpm, one in. arbor. Net weight is 560 lb. Shipping weight is 700 lb. Height including base is 66 in., width is 20 in., length is 40 in. Can be furnished with 7½ or 10 hp 220/440v, three phase, 60 cycle motor. *Beaver Pipe Tools, Inc.*

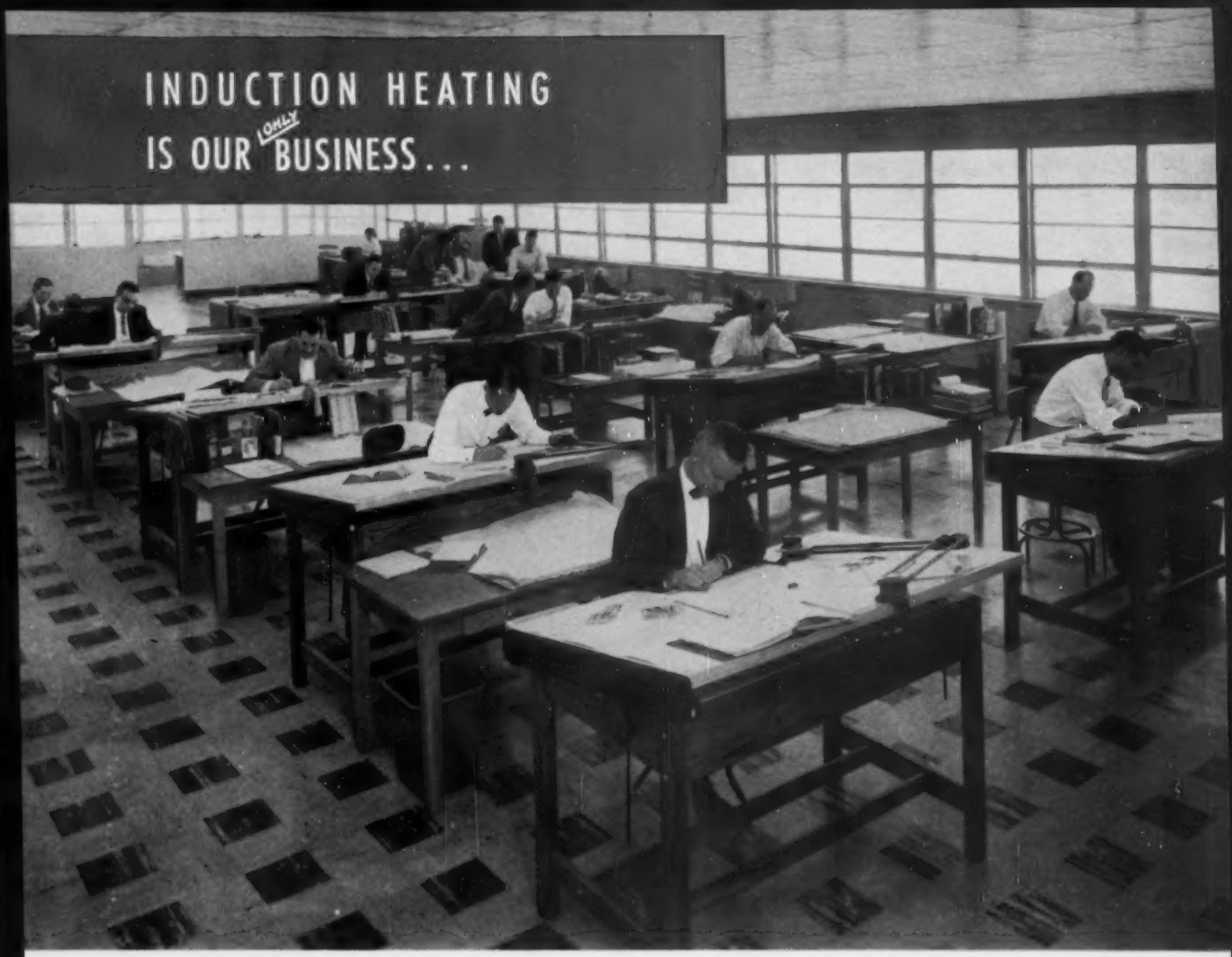
For more data circle No. 34 on postcard, p. 129



## Broaching machine features automatic parts transfer

Automatic transferring of parts into and out of the work station and a ram speed infinitely variable from 30 to 150 sfpm are features of a new horizontal broaching machine. Work moves through the broaching station from right to left, in the same direction as broach's cutting stroke. Parts are fed by conveyor into loading station at machine's right side. From load to unload station, cycle is automatic. Floor space it requires is 194 x 290 in. Height is 96 in. *Colonial Broach & Machine Co.*

For more data circle No. 35 on postcard, p. 129




*Subject at hand . . .*

# INDUCTION HEATING EQUIPMENT

## High · Dual · Low

Your induction heating specs receive full attention here. These engineers are specialists in induction heating equipment. Some are mechanical men . . . others are electrical. Together, they can design the simplest or most complex induction heating equipment, low or high frequency.

Magnethermic's personnel know heat-treating, hot working and joining. They know forging and brazing. Induction heating is our only business.

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IN ADDITION TO ITS REGULAR LINE of precision gears, one of New England's oldest and ablest gear-engineering organizations is now fully equipped to produce fine pitch gears to your own specifications. Any size and quantity... any type of basic material, metallic or non-metallic. Complete heat-treating facilities.

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**PERKINS MAKES:** bevel gears, ratchets, sprockets, ground thread worms, helical gears, spiral gears, spur gears-shaved or ground teeth, gear trains and assemblies, speed reducers.

* **The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7 1/2x16". A POWER MODEL is available. Information on request.**

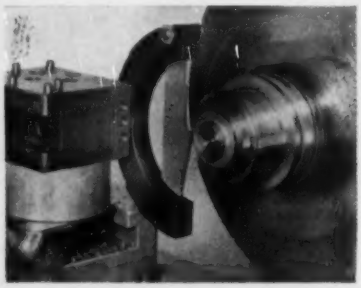
**PERKINS MACHINE & GEAR CO.**

**103 Circuit Ave., WEST SPRINGFIELD, MASSACHUSETTS**



## Cut-off assembly

Construction of this cut-off tool eliminates overhang problem by supporting cutting edge by tension instead of bending moment as on conventional type blades. This permits use of a thinner blade in relation to depth of cut. The vertically hung blade completely eliminates

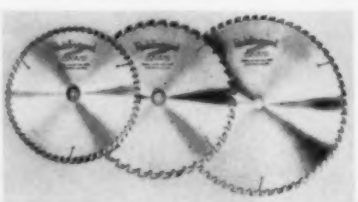


tool chatter. There is also less heat created giving longer blade life. Tool is stable on interrupted cuts such as hex, octagon and square materials, and on blanks of all kinds. Available for cuts up to 4½ in. It is adaptable to automatic, turret and engine lathes. *Wye-Stanley Tool Co.*

**For more data circle No. 36 on postcard, p. 129**

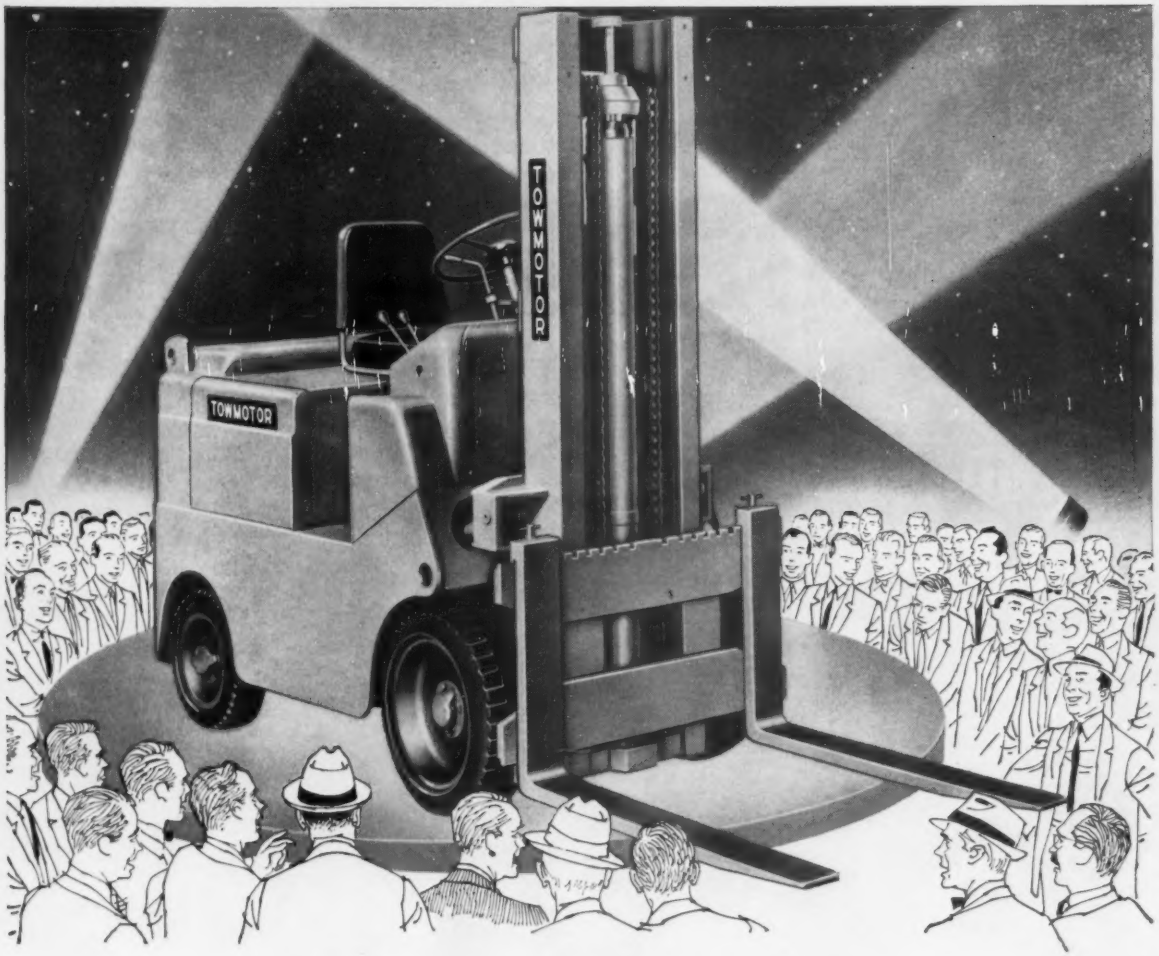
## Radialloy-tip saw blades

These Radialloy-tipped saw blades combine high quality heat-treated, precision-ground steel blades with permanently brazed, durable, wear-resistant, carbide tips. They are more wear-resistant than ever be-



fore. Blades feature full steel back construction. This, in addition to precision diamond grinding and finish to the cutting-tip edge, is said to produce a sharp, long-life saw. Company says it cuts cleaner and faster, requiring less re-sharpening. They are available in a complete line and can be supplied to suit individual application problems. *Radial Cutter Mfg. Corp.*

**For more data circle No. 37 on postcard, p. 129**




# INTRODUCING THE NEW "PACE-MAKER" SERIES
# TOWMOTOR FORK LIFT TRUCKS

*Again Towmotor sets the pace with a new concept of power and low-cost performance in modern materials handling!*

Here is an entirely new concept of fork lift truck performance—new styling, new precision operation and new maneuverability that sets the "Pace-Maker" series apart as the most significant advance in materials handling in recent years.

Towmotor engineering, carefully planned after a penetrating study of industry's needs, has created a number of unique, highly efficient features—combining to give you surprising economy for such powerful performance. The four all-new "Pace-Maker" models are designed to fit a wide range of materials handling needs, with lift capacities from 6,000 to 11,000 pounds.

Among the notable features of the new series is improved power steering now available, optionally, as original equipment. Other features offered for the first time include such outstanding advances as:

*Advanced styling* by a leading industrial designer.

*New functional body design* that provides ample underclearance, greater driving comfort, easy accessibility to engine and parts.

*Exceptional maneuverability* through more positive operating control and dexterous load positioning.

*More powerful engines*—three new power-packed types for Gasoline, Diesel or LP-Gas models.

*Adjustable off-center seating* assures maximum visibility and extra operating ease.

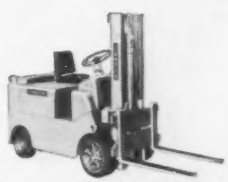
*Precision steering* makes manual or power operation exceptionally efficient (power steering optional).

*Choice of improved "TowmoTorque" drive* or standard transmission as original equipment.

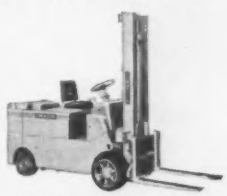
Whatever your materials handling needs, it will pay you to first look into the new, cost-saving improvements offered by Towmotor "Pace-Maker" Series Fork Lift Trucks. For more detailed information write Towmotor Corp., Div. 1506, 1226 East 152nd St., Cleveland 10, Ohio.

**TOWMOTOR**
THE ONE-MAN-GANG®

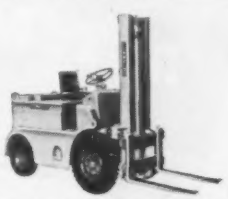
***America's Best-Engineered Fork Lift Truck***



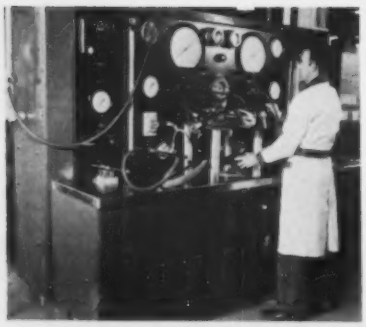
**NEW** Model 600 with lifting capacities of 8000 and 9000 pounds.



**NEW** Model 670 with lifting capacities of 10,000 and 11,000 pounds.



**NEW** Model 680-P with lifting capacity of 6000 pounds.

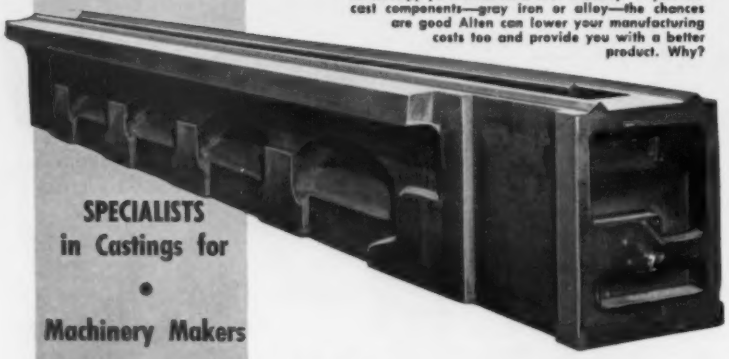


## Test machine finds microscopic flaws and defects

Capable of finding all types of microscopic flaws and defects, a new self-contained hydraulics test machine has been produced. Now in use at an aeronautics supply manufacturer, the specially designed unit tests precision control valves for leaks, holes and pressure drop. Up to four tests can be run at once on a single hookup. Present unit is equipped with a 22 gpm 500 psi fuel pump. It is designed for pumps that can deliver 50 gpm at 1500 psi. Built into the machine, along with the high flow equipment, is a dc power supply, electric stop clock, and a high pressure fuel booster capable of 3000 psi static pressure. *Areo Supply Mfg. Co.*

For more data circle No. 38 on postcard, p. 129


# Machine Tool Makers use ALTEN CASTINGS for jobs like this..



This lathe bed is typical of numerous castings which Alten supplys the machine tool industry. If you use cast components—gray iron or alloy—the chances are good Alten can lower your manufacturing costs too and provide you with a better product. Why?

SPECIALISTS in Castings for

• Machinery Makers

• Manufacturers of Earth Moving Equipment

• Engineering and Construction Companies

•

ALTEN FOUNDRY AND MACHINE WORKS INC. LANCASTER, OHIO

## If You use castings . . .

Advance techniques employed by Alten result in extra qualities you don't pay for. These include: greater strength and rigidity, abrasion and corrosion resistance, closer tolerances, increased vibration absorption, more durability, etc.

So, if you use custom castings, please drop us a note—we'll be glad to quote on your requirements. Our machining facilities may be of interest, too.

The coupon will bring our facilities brochure.

ALTEN
200 West Wheeling St., Lancaster, Ohio

Please send Booklet Number 12

NAME_____

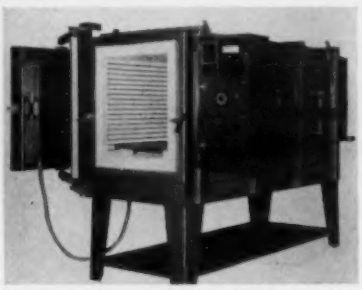
COMPANY_____

ADDRESS_____

CITY_____ ZONE___ STATE_____


## Heat treat furnace

For close control of furnace gradients, this new furnace has been designed to handle many critical temperature heat treating operations. Interior dimensions are: 24 in. wide x 24 in. high from hearth to roof and 72 in. long. Not only



even temperature is attained but different temperatures in separate parts of the furnace are controlled and indicated by a thermocouple selector switch. Furnace has six zones. Other advantages are: variable heating-up rates, cooling-down rates, or maintaining input equal to furnace losses. *L & L Mfg. Co.*

For more data circle No. 39 on postcard, p. 129

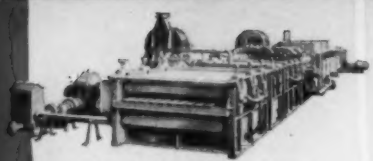
## Battery charger

Designed for rider type lift trucks, this new power unit was previously available only for walkie type trucks. The unit has a permanently mounted charger permitting the truck battery to be given a power boost whenever the truck is not in operation during the day or overnight. It can be easily charged by plugging the charger into any 110 or 220v 60 cycle outlet. Charger can be left "on" without any damage to the battery. *K-W Battery Co.*

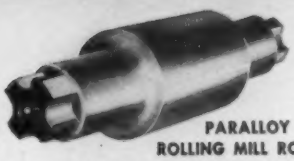
For more data circle No. 40 on postcard, p. 129

# "YOUNGSTOWN" EXPERIENCE PAYS OFF IN BETTER RESULTS FOR YOU

Steel Mill Equipment - Heavy Machines - Complete Lines

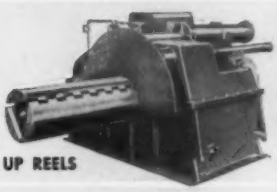


SCRUBBER & CLEANING LINE



PARALLOY ROLLING MILL ROLLS
MERCHANT—ROD—BAR—SKELP

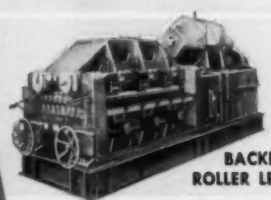
36" CONTOUR ROLL LATHE



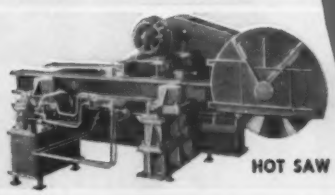
TAKE UP REELS

SLAB PUSHER

90" x 240" x ¼" STRETCHER LEVELER



BACKED UP ROLLER LEVELER



HOT SAW

DUCTILE RUN-OUT TABLE ROLLS

## "Youngstown" Machinery serves major steel mills from coast to coast

"Youngstown" is well-known for its 70 years of experience in the designing, engineering and building of heavy, steel mill machinery. Pictures at left show a few examples . . . Complete lines—major units and auxiliaries. Additional "YF&M" products include ductile iron gears, rolls and castings up to 100,000 pounds.

"Youngstown" also builds extrusion presses and equipment for the "light metals" industry.

## Modern Pickling Line cuts costs for western mill

Better pickling with less acid consumption . . . "Youngstown's" latest high speed continuous strip pickling line utilizes a new pull-thru type TRIPLE SCALE BREAKER that eliminates the need for a pinch roll stand.

## Complete Scrubber Line built for midwest plant

This typical sheet scrubber line provides the ideal solution to the cleaning problem involving enamel sheet stock, dry or oiled stock, sheets for tin plating and special service sheets.

## 36" Contour Roll Lathe wins laurels for new improvements

Completely hydraulic tracer control insures smoother, more accurate finish. Featured improvements provide better turning, either on necks or centers. Built to suit specific needs.

## Slitting Line speeds production for brass manufacturer

This complete 25" slitting line for brass and copper is giving "right-for-the-job" service. "Youngstown" has the correct answer for any slitting problem, whether it is .002" brass, copper, aluminum, or ⅜" steel plate.

## Ductile Run-out Table Rolls excel in hot strip mill

Ductile cast iron rolls are reducing maintenance in leading mills. Especially good under the sprays. Resist heat check and breakage. Ductile iron is the ideal maintenance material for aprons, roller boxes, looper tables and looper rolls.

***Consult us about your problems.***
***Let us quote on your requirements.***

The Youngstown Foundry & Machine Co.

SERVING INDUSTRY SINCE 1885

Y&M

*Youngstown, Ohio*

## Light dock plates introduced for trucks

Light weight dock plates have been introduced for use on truck docks only. New units are made of high strength magnesium alloy, and are easily handled by one man, company says. Nine standard sizes are available, from 36 to 72 in. wide, and from 24 to 48 in. long. Load ratings are from 1800 lb to 4800 lb axle load. Features include: positive position stops to securely lock the board in place between dock and carrier; beveled plate edges to minimize load jar and prevent load loss; crowned construction to prevent "hang-up" of low underclearance equipment, and provide safe, smooth crossover. *Magline Inc.*

For more data circle No. 41 on postcard, p. 129


**WEBB** PLATE FABRICATING MACHINERY

*Steelworkers* ALL STEEL CONSTRUCTION

DELIVERY 10 DAYS

The Webb Corporation, in presenting the line of new WEBB STEELWORKERS, has designed versatile machines for either job-work or high production work. These units have been engineered to meet the particular need of shops having a variety of work, with a result that all-purpose machines are now available.

Five Complete Tools are Incorporated in a Single Unit.

1. Punch for plate, bars or structurals.
2. Cuts angles and tees with straight or miter cut.
3. Cuts off round and square bars.
4. Shears plates and bars.
5. Coping or notching attachment.

One of the main features of these machines is that they are at all times in complete readiness to do any of the above operations and to do the work well.

The punch may be operated at the same time as either the section cutter, bar cutter, shear or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interference. For illustrated literature and prices, write Dept. E.

*Let Speed PAY–The WEBB Way!*

SLIP ROLLS

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

STEELWORKERS

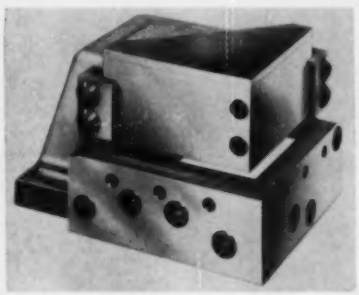
Also Manufacturers of INDUSTRIAL WEIGHING EQUIPMENT

*Since 1881* THE **WEBB** CORP.

WEBB CITY, MO., U. S. A.


## Edge notching units

Announcement has been made of a complete new line of uninotch corner, vee, and edge notching units. These individual units are designed and constructed for changing of dulled punch and die steels with new or sharpened punch and die steels. This interchangeable advantage of cutting steels is so simple that operation is performed during production run without removing the unit from setup. They are available in 8⅜ in. shut height and 3½ in. die height with an operating capacity up to ¼ in. metal thickness and 5½ in. shut height and 2 19/32 in. die height with an operating capacity up to ⅛ in. metal thickness. *Punch Products Corp.*

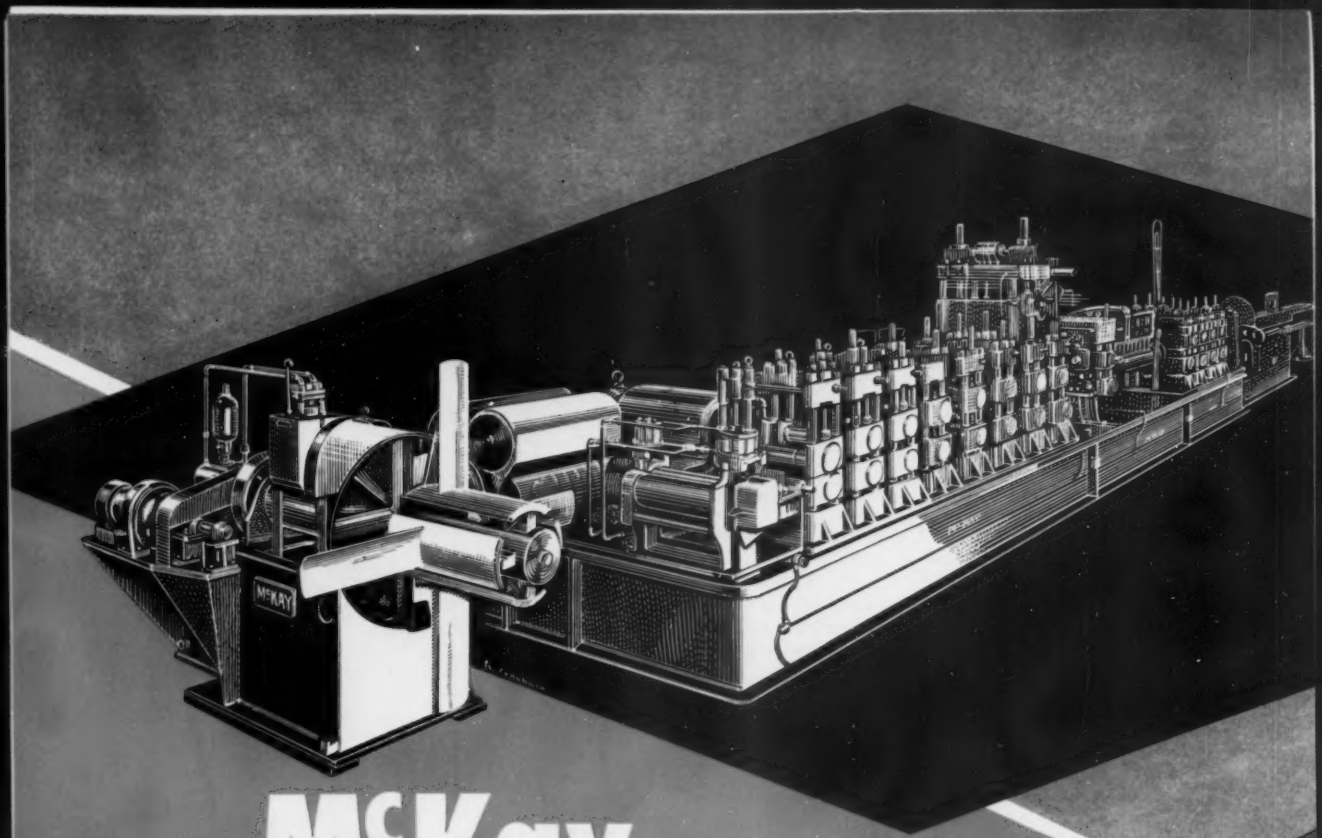


For more data circle No. 42 on postcard, p. 129

## Separation magnet

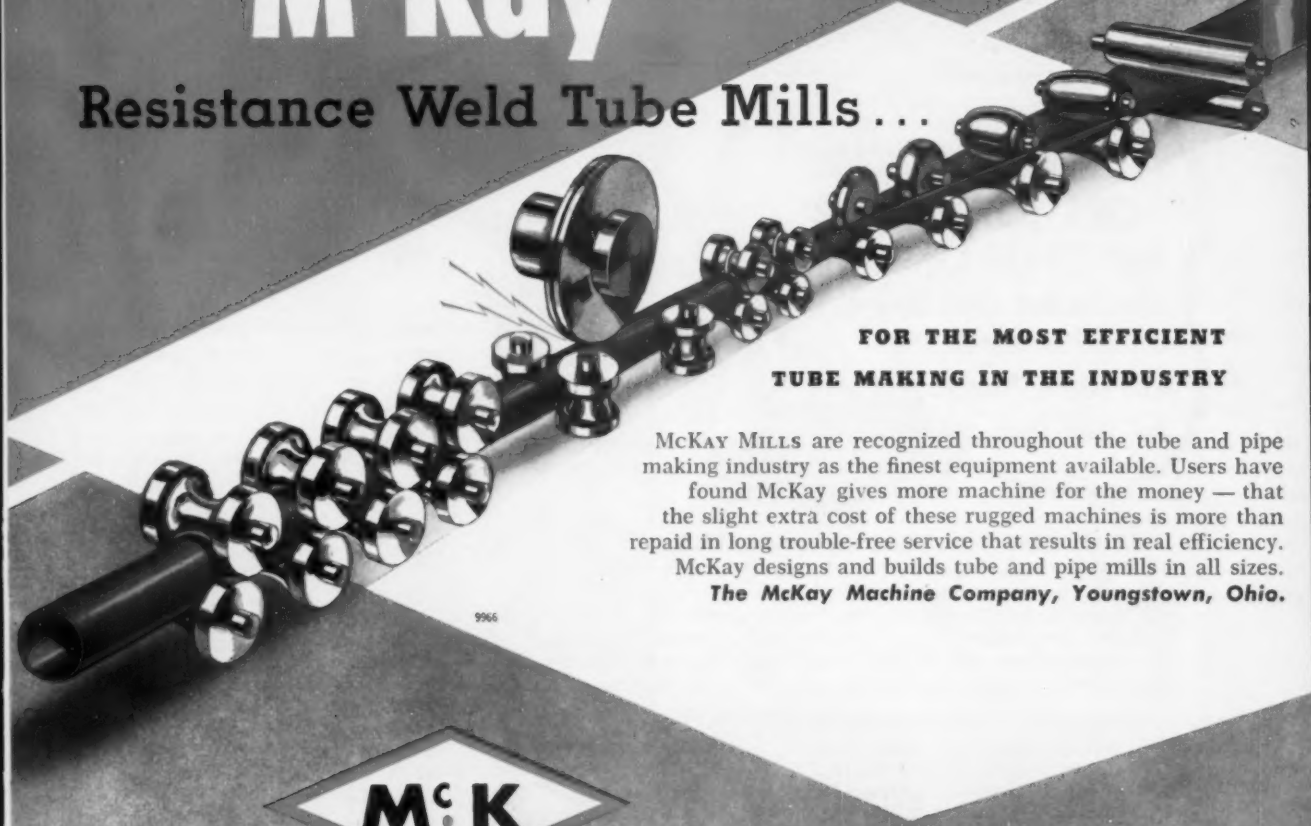
Company has announced a new line of suspended separation magnets for use with conveyor systems. Suspended over the head pulley or anywhere along belt, magnet's powerful pulling force digs out imbedded tramp iron in the flow of material. It is designed to prevent "sneak throughs" that could contaminate the product or ruin machinery. *Stearns Magnetic, Inc.*

For more data circle No. 43 on postcard, p. 129




# McKay

## Resistance Weld Tube Mills . . .



**FOR THE MOST EFFICIENT**

**TUBE MAKING IN THE INDUSTRY**

McKay Mills are recognized throughout the tube and pipe making industry as the finest equipment available. Users have found McKay gives more machine for the money — that the slight extra cost of these rugged machines is more than repaid in long trouble-free service that results in real efficiency. McKay designs and builds tube and pipe mills in all sizes.

***The McKay Machine Company, Youngstown, Ohio.***

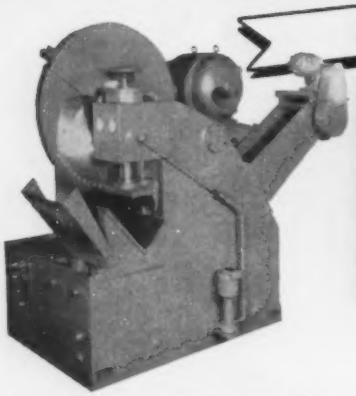
9966

McK

*SETTING THE STANDARDS OF QUALITY IN METAL WORKING MACHINES FOR TWO GENERATIONS*

*Proved Better*

BY PERFORMANCE



**Ruthman Gusher Coolant Pumps**

Illustrated is a Loma Saw SPH-36 equipped with a Gusher Coolant Pump and arranged for Billets and Slabs.Courtesy of the Loma Mach. Mfg. Co., Inc.

**The year in and year out popularity of Ruthman Gusher Coolant Pumps with the leading machine tool builders is ample proof of their outstanding performance.**

**Gusher Coolant Pumps give you split second coolant flow — require no priming. Their sturdy construction, pre-lubricated ball bearings, electronically balanced rotating assembly assure you of long trouble-free life with minimum maintenance.**

THE **RUTHMAN** MACHINERY CO.

1809-1823 READING ROAD CINCINNATI 2, OHIO

**SILENT HOIST KRANE KAR**

**"DOES JOB FASTER, SAVES US ONE MAN,"**

***says Jim Gull, Supt. Equip't., Gull Contracting Co., New Lincoln Tunnel Job, New York***

***Another SILENT HOIST "First" —FLUID DRIVE!***

"We had a 20-ton crane on the job; now the KRANE KAR* does it faster and saves us one man. Works all over site as utility crane, 8 hrs. a day, 5 or 6 days a week. Handles beams, buckets, concrete and steel forms, lumber, cement, etc. Stores incoming materials and delivers them where needed. Loads, unloads trucks, and carries big loads up and down ramp. KRANE KAR is easy to operate; we have a half dozen men here who can run it. Doing a fine job for us," says Mr. Gull.

***Write for illustrated Bulletin No. 79***

**KRANE KAR Swing-Boom Mobile Crane available gas or diesel; adjustable telescopic boom; rubber tired; 5 sizes: 1½, 2½, 5, 10, 12½ ton cap.*

**SILENT HOIST & CRANE CO.**

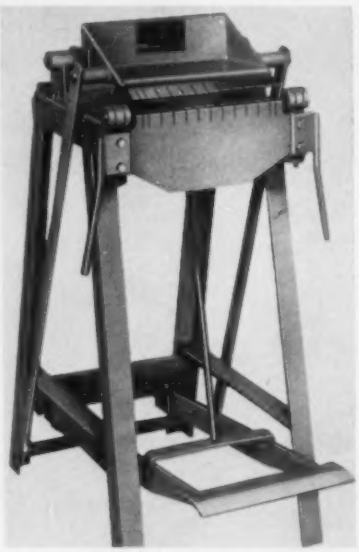
*Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment*

851 63rd Street, Brooklyn 20, N. Y.




## Bending brake

Makers of metal signs and displays can now obtain a little bending brake designed to their needs. This metalworking tool is said to speed up the making of sheet-metal letters of the solid or channel type. Brake's main feature is the upper jaw, lower jaw, and apron containing matching 3/16 in. slots spaced on 1 in. and ½ in. centers. This



enables brake to bend drum return strips which have seamed and folded edges. Slots are ¾ in. deep and jaws are 12 in. wide, so it can handle drum return from ½ in. wide up to 11 in. wide or better depending on arrangement of folds and seams. Tool will handle any metal up to 20 gauge thickness, including stainless steel. *Whitney Metal Tool Co.*

**For more data circle No. 44 on postcard, p. 129**

## Liquid spring

This compact, self-contained liquid spring for draw dies doubles the stroke of equivalent coil springs while tripling the preload and end load with low spring rates and high spring force, according to its maker. Novel construction permits the liquid spring to be designed to approach a constant force. Spring is said to develop up to ten times the force of a standard heavy-duty coil spring. *Taylor Devices, Inc.*

**For more data circle No. 45 on postcard, p. 129**

*When the foot brake isn't enough*

# STOP CRANES SAFELY with EC&M

## DYNAMIC BRAKING BRIDGE-STOP CONTROL

**POSITIVE STOPPING by the same motors that drive the crane . . . even when power fails or overload relays trip.**

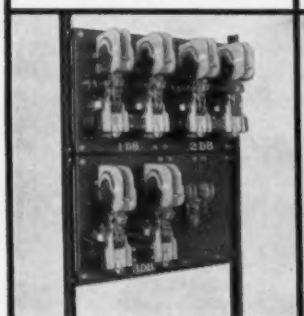
Now . . . collision between cranes, crashing into the end-bumpers, and wheel-sliding stops can be avoided by the use of simple equipment. Crane motors are automatically converted into self-excited generators by this EC&M Bridge-Stop Control to provide quick, positive stopping. Transition to dynamic braking occurs instantly on power failure or when overload relays trip. Braking is not dependent on an outside source of power.

This EC&M system of control is fast and equally effective when traveling in either direction. Graduated braking is maintained throughout the entire stopping period by a pulsating spring-closed contactor . . . an exclusive EC&M feature. On icy, slippery rails, wheels do not slide to a stop . . . instead, this system automatically releases and then re-applies retardation to give a quicker stop than when the wheels remain locked.

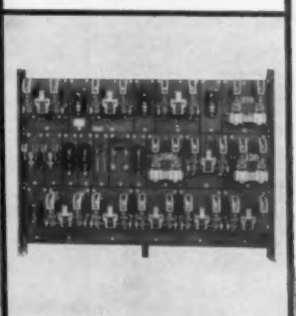
EC&M Dynamic Braking Bridge-Stop Control is easily applied to new and old cranes to provide power-failure emergency operation. It is also designed for service-braking operation which is selectively applied by the operator or end-zone limit switches.

Eliminate hazards due to slippery rails . . . inability of operator to reach foot-brake in time when power fails.

Obtain smoother, safer operation when you change over to EC&M Dynamic Braking Bridge-Stop Control.



For existing installations, this panel provides graduated dynamic braking for quick, sure stops.



Complete Duplex (2-motor) Controller including EC&M Dynamic Braking Bridge-Stop Control.

6149

**Write for Bulletin 921-6.0**

**SQUARE D COMPANY**

EC&M DIVISION • CLEVELAND 28, OHIO

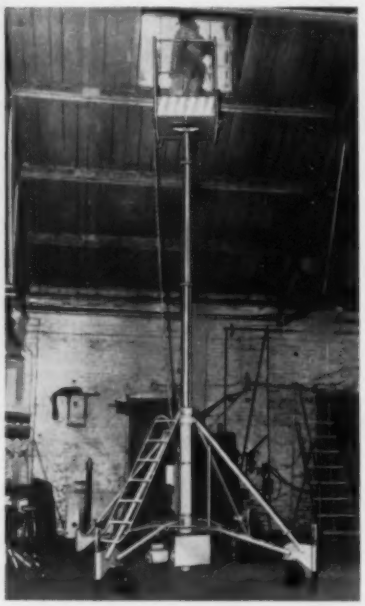
QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

## Mobile lift

Designed for reach to 42 ft above floor level, a hydraulically operated lift emphasizes positioning ease, elevation speed and safety. It can be used indoors or out. Easily transported from one location to another, it folds up to pass through doorways, narrow corridors, in and out elevators. Stability is described as assured by screw-type leveling jacks at each corner to hold lift in



steady, level position. Large swivel-type casters permit mobility. A ladder provides access to platform in "down" position. Mechanic has complete control for raising, stopping, and lowering by means of a pushbutton control located on platform's guardrail. Area of the platform is 2 ft 3 in. x 2 ft 3 in. Platform load is rated at 350 lb. *Ballymore Co.*

For more data circle No. 46 on postcard, p. 129

## Tubeless tires

Tubeless tires have become standard equipment on one firm's scrapers. Prime advantage of the new tires is their ability to sharply reduce down time caused by conventional tires and tubes. In many cases down time caused by tires has been reduced more than 80%. *Caterpillar Tractor Co.*

For more data circle No. 47 on postcard, p. 129

STAMPINGS for the FINISHED PRODUCT

SEE SESSIONS . . . for Metal Specialties, Box & Case Hardware, Stamped Assemblies in a wide range of finishes.

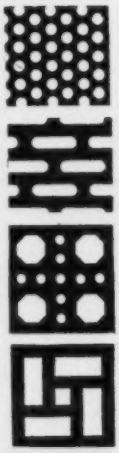
J. H. SESSIONS & SON

290 RIVERSIDE AVENUE • BRISTOL, CONN.

DIAMOND PERFORATED METALS

Need Holes in Metal Sheets?

Several considerations must usually be observed. The design should be attractive in appearance and the percentage of open area should be adequate while, at the same time, affording suitable concealment of what lies behind or underneath. Naturally, also, the right metal should be used in the right thickness. Whenever Perforated Metal is required, and it has thousands of applications today, you'll do well to contact Diamond. Forty years of widely diversified experience and hundreds of modern tool arrangements enable us to give unsurpassed service and delivery. Catalog 39 (32 large pages) gives complete illustrated information. No charge or obligation.



DIAMOND MANUFACTURING CO.
Box 41 WYOMING (Wilkes-Barre Area) PENNA.

Metal Stamping Facilities by Lansing

at your Service for...

ELECTRICAL EQUIPMENT
HOUSEHOLD APPLIANCES
TRANSPORTATION EQUIPMENT
INDUSTRIAL EQUIPMENT
FARM IMPLEMENTS

Lansing Stamping Co.
ESTABLISHED 1914
LANSING 2 MICHIGAN

# USS GERRARD

## ties anything you've ever seen

Assembly-line strapping of cartons of Allis-Chalmers engine parts with USS Gerrard Round Steel Strapping and the Model Q machine.

A tractor packaged for export shipment, being reinforced with a diagonal tie of USS Gerrard Round Steel Strapping.

Allis-Chalmers engine blocks, 24 to a pallet, being reinforced for shipment with USS Gerrard Round Steel Strapping. Pallet weighs 4,000 pounds.

## Allis-Chalmers Manufacturing Company, Tractor Works, West Allis, Wis., reinforces packages of all sizes quickly, securely, and inexpensively with USS GERRARD ROUND STEEL STRAPPING

When Allis-Chalmers West Allis, Wis., Tractor Works began packaging replacement parts in cartons to improve its shipping operation, USS Gerrard Round Steel Strapping was chosen as reinforcement. As a result, it provides a neat, inexpensive way to close cartons quickly, protects the product, saves the carton for re-use, and displays the advertising on the box continuously.

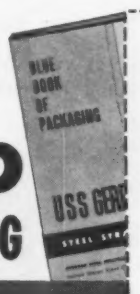
Allis-Chalmers is using USS Gerrard Round Steel Strapping to secure packages which vary from 4-inch-square boxes, weighing less than a pound, to huge 38" x 30" x 34½" cartons which weigh up to 3,000 pounds. Even complete tractors are disassembled and crated for export to reduce cubage charges. They, too, are reinforced with USS Gerrard Round Steel Strapping.

Take a tip from a highly successful organization, and try USS Gerrard Steel Strapping — Round or Flat. Whatever your packaging-tying problem might be, our engineers can help you find the safest, most economical solution. Contact us now.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CHICAGO, ILLINOIS

USS GERRARD STEEL STRAPPING
*Round and Flat*

UNITED STATES STEEL




SEND FOR THIS NEW BOOKLET NOW

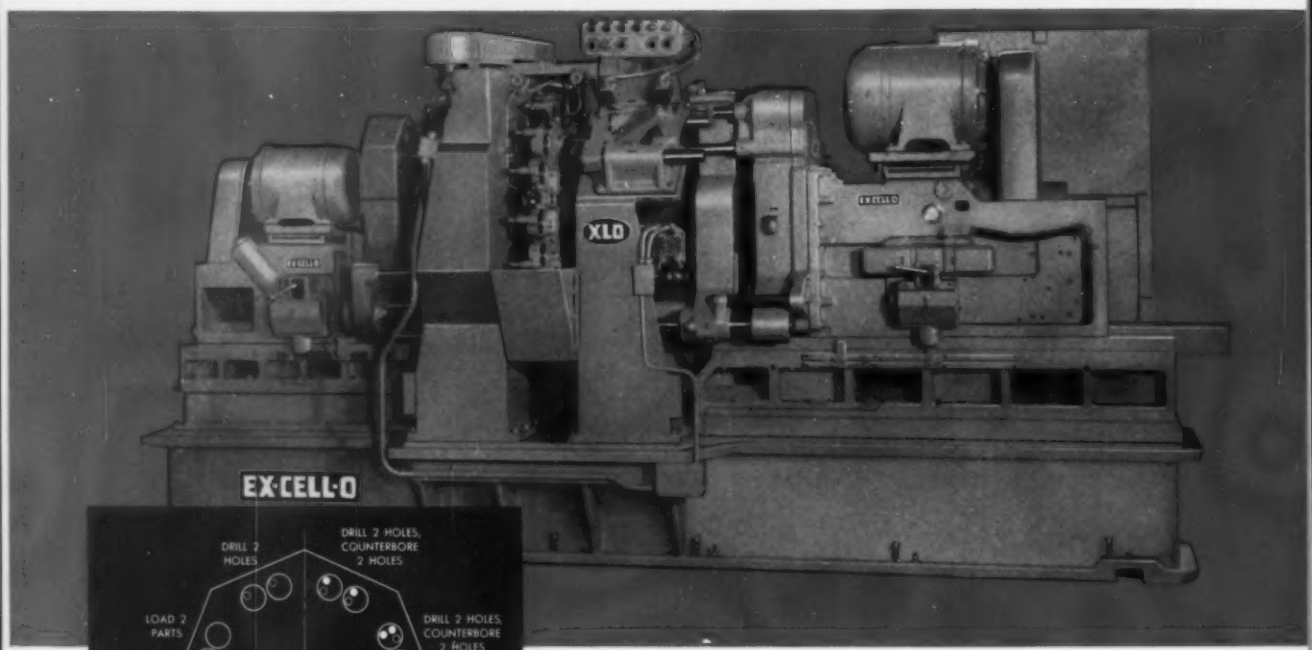
Gerrard Steel Strapping
4711 South Richmond St., Chicago 32, Ill.

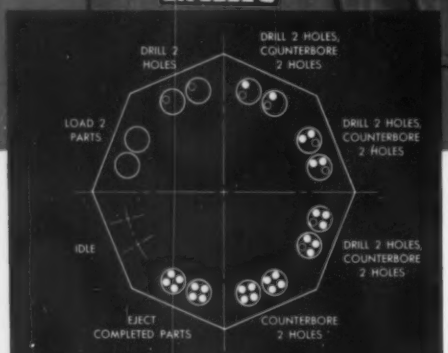
Please send me, free of charge, the new 36-page GERRARD Blue Book of Packaging.

Name .....
Company .....
Address .....
City ..... State.....

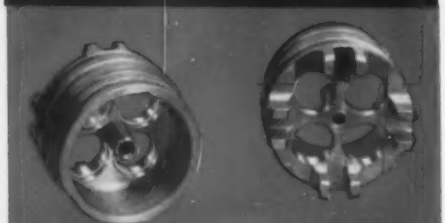
## SPECIAL EX-CELL-O MACHINE

# *Drills and Counterbores 514 Rocket Nozzles per Hour*




This diagram shows the progressive operations. At station 7, parts are automatically ejected.



Front and rear view of completed part. The rocket nozzle is tough forged steel; location of holes to each other and to the four pronged slots is critical.

Here's another Ex-Cell-O solution to a hard-to-handle machining job. Rocket nozzles are small, tough steel forgings. For the drilling and counterboring operations—shown in diagram—critical dimensions must be held.

Ex-Cell-O designed and built this special machine with a trunnion fixture that indexes through eight stations. Two Standard Ex-Cell-O Slide Type Hydraulic Power Units—one for drilling, the other for counterboring—actuate the multiple spindle heads. Features of the machine include simplified design, high productivity, safety and sturdiness. . . . When you're faced with a tough machining problem, call in Ex-Cell-O.

XLO
EX-CELL-O for PRECISION

**EX-CELL-O CORPORATION**

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-28

# The Iron Age SUMMARY . . .

**Critical phase of labor talks spurs production and builds pressure for deliveries . . . But steel inventory picture is gloomy . . . Genuine steel needs promise good outlook.**

**Labor Talks Critical . . .** With steel labor talks entering a critical and uncertain phase, steel consumers with comfortable inventories are congratulating themselves for their foresight. Unfortunately, few consumers are well off inventorywise.

It's an old story at this stage of steel labor talks. No one is certain of the outcome. So the better part of valor is to lay in as much steel as possible. As a result, the mills are going all-out on production, and consumers are increasing pressure for delivery.

But the pressure is not based entirely on the uncertain labor outlook. Underlying strength of the steel market—overshadowed momentarily by the downturn in some consumer lines—is again coming to the fore. In many industries, the need for steel now and in the months ahead is founded on good business prospects.

**Southern Preview . . .** This genuine need for steel to meet production requirements strengthens belief that an industrywide shutdown would strike a quick body blow to metalworking. Structural and plate consumers, particularly, would feel the impact. Effect of the seven-week shutdown of Tennessee Coal & Iron Div., of U. S. Steel Corp., on steel-using plants in the South gives a revealing picture of the real situation in steel inventories.

Meanwhile, the five-year contract proposal of the Big Three steel producers provides consumers with plenty to mull over on the matter of future steel prices. If the usual pattern were followed—assuming a five-year agreement—steel prices would rise annually as yearly provisions for higher wages and fringes went into effect. "Steel is money in the bank" would be a perennial thought for metalworkers. Incidentally, if this year's settlement cost runs close to 20 cents an hour, prices will rise about $10 per ton—some less, some more.

**The Outlook . . .** Steel operating rate is expected to decline in third quarter, with July-August production dropping to 80-85 per cent of capacity. This is not a "recession" trend; it merely reflects a normal seasonal decline for summer months, when heat, repairs, and vacations take their usual toll.

There will be a snapback, beginning late in third quarter, and fourth quarter business will be good.

## Steel Output, Operating Rates

| Production | This Week | Last Week | Month Ago | Year Ago |
|---|---|---|---|---|
| (Net tons, 000 omitted) | 2,375 | 2,314 | 2,375 | 2,304 |
| **Ingot Index** | | | | |
| (1947-1949=100) | 147.9 | 144.1 | 147.9 | 143.3 |
| **Operating Rates** | | | | |
| Chicago | 97.0 | 100.0 | 100.0 | 97.5 |
| Pittsburgh | 98.0 | 96.0* | 100.0 | 99.0 |
| Philadelphia | 103.0 | 102.0* | 100.0 | 97.5 |
| Valley | 97.0 | 97.0* | 99.0 | 97.0 |
| West | 102.0 | 99.0* | 100.0 | 97.0 |
| Detroit | 98.0 | 99.0 | 97.0 | 97.0 |
| Buffalo | 105.0 | 105.0 | 105.0 | 105.0 |
| Cleveland | 103.0 | 99.5* | 106.0 | 102.0 |
| Birmingham | 23.5 | 23.5 | 23.5 | 92.5 |
| S. Ohio River | 88.0 | 90.0* | 92.0 | 76.0 |
| Wheeling | 103.0 | 103.0 | 105.0 | 102.0 |
| St. Louis | 97.0 | 102.0 | 99.0 | 106.0 |
| Northeast | 85.0 | 84.0 | 93.0 | 89.0 |
| **Aggregate** | 96.5 | 94.0 | 96.5 | 95.5 |

*Revised

## Prices At A Glance

(cents per lb unless otherwise noted)

| | This Week | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| **Composite price** | | | | |
| Finished Steel, base | 5.179 | 5.179 | 5.179 | 4.797 |
| Pig Iron (Gross Ton) | $60.29 | $60.29 | $60.29 | $56.59 |
| Scrap, No. 1 hvy (gross ton) | $44.83 | $44.83 | $49.67 | $35.33 |
| **Nonferrous** | | | | |
| Aluminum ingot | 25.90 | 25.90 | 25.90 | 23.20 |
| Copper, electrolytic | 46.00 | 46.00 | 46.00 | 36.00 |
| Lead, St. Louis | 15.80 | 15.80 | 15.80 | 14.80 |
| Magnesium | 34.50 | 34.50 | 34.50 | 29.25 |
| Nickel, electrolytic | 64.50 | 64.50 | 64.50 | 67.67 |
| Tin, Straits, N. Y. | 94.625 | 94.00 | 96.875 | 94.50 |
| Zinc, E. St. Louis | 13.50 | 13.50 | 13.50 | 12.50 |

# Mills Weigh Tinplate Problem

**American Can Company's do-it-yourself program aims to cut high cost of sheet tinplate processing . . . Steelmen see reason, but hope that research will increase demand for tinned coils.**

◆ TINPLATE MILLS, faced with American Can Company's plan to spend $27 million for tinplate processing facilities, are hopeful that expansion in the container market will make up for the loss in revenue.

It will take time—possibly two years — for the can maker to switch over to processing coil stock, steel men figure. By that time research will have created more uses for metal containers, offsetting the loss.

American Can Co., riled by the eighth increase in tinplate prices since 1946, announced the move as a "cost-cutting measure." (See P. 61 for full story.)

Steel men are concerned over the slice that will be taken out of a market that accounts for nearly 9 pct of their shipments, but they admit it makes good sense for the container people to process their own coil.

Another leading can maker, Continental Can Co., also is researching for ways to reduce its dependence on steel. In addition to testing equipment for handling tinplate in coil form instead of sheet, Continental is trying out combinations of steel, plastics, and other materials. Others are likely to follow suit.

Behind the can companies' actions is a threat that their customers—the packagers—will start making cans for themselves if prices go up again. One big food concern, California Packers, already has gone this route and more may follow. For this reason, the can companies must act aggressively in cutting costs.

A wholesale switch to tinplate coil processing by the can makers would bring these changes in tin mill operations: elimination of cutting lines, elimination of sorting rooms, expansion of shipping departments, addition of coilers. One producer figures it would have to lay off some 500 workers.

In the meantime, the American Iron and Steel Institute reported two steel production records shattered in May. Net tonnage of steel ingots and castings for the month was 10,496,000 — exceeding the May, 1955 record by 167,684 tons. During the first five months of 1956, output totaled 52,904,135 tons, another record. It was 5.4 million tons more than was produced in the same period last year.

SHEET AND STRIP . . . In **Pittsburgh,** hot-rolled products continue to take up the slack in cold-rolled sales. Some mills expect hot-rolled orders to keep operations going at capacity for remainder of the year. **Chicago** mills similarly are operating at capacity despite acknowledgments by mill men that customers have built hefty stocks. Auto buying is in for a further cut in July—as much as 50 pct at some mills—but this was expected, considering the closeness of the model change. Even so, some strip people are talking capacity operations through July. In the **Detroit** market, all type sheets and strip are easy to get. Small orders are being placed for July and August. Reports from **Cleveland** show some June shipments to automotive plants are for new sizes for 1957 models as a hedge against a strike or price increase. Another major auto division told steel producers it will take its full quota in September. The trend probably will be widespread to get new models on the road as soon as possible. In **Philadelphia**, the market continues soft.

BARS . . . Slack in the **Pittsburgh** automotive and farm machinery market are reflected by low alloy bar sales, according to one mill. Summer bookings do not indicate any real pick-up until September. Jones & Laughlin announced a May 21 revision of packaging extras on merchant quality hot-rolled carbon steel bars. The move follows a similar announcement on special quality bars. In **Chicago**, cold finished bars are booked solid for remainder of month, but then are due for a hefty drop, millmen say. Orders are current except for big rounds, which are solid through August. Smaller sizes are available on three-week delivery. In **Detroit**, the market is very soft. All sizes are easy to come by and sizable orders are far between.

PLATE AND STRUCTURALS . . . Reports from all major industrial areas are the same—these items are as hard to get as ever. **Chicago** area mills have quotas filled well into 1957. One **Detroit** automaker says it will gladly pay premium price for wide-flange beams in order to complete construction of a foundry addition to its plant. In **Cleveland,** one producer who decided to turn out thinner sizes of plate on sheet mills to absorb drop-off in cold-rolled sheet business, picked up orders for 35,000 tons the first two days after the plan was announced. This despite the fact they will be in coils, unstraightened and have up to 5 pct scrap. Good weather in California is making structurals tighter.

WAREHOUSES . . . **Pittsburgh** firms report hot-rolled sheets still tight. Plate and structurals even tighter. **Chicagoans** have no complaint about inventory in any product save plate and structurals, but business is holding up very well. June levels apparently are above May, but the seasonal dropoff is expected in July. **West Coast** warehousemen are selling everything they can get. Customers are trying to stock up against strike or price hike, but so far are using most products they get for current orders.

**Purchasing Agent's Checklist**

PACKAGING: Can companies oppose tinplate price hike . . . . . p. 61

MARKETING: Inroads of aluminum don't worry copper producers p. 62

DEFENSE: Urge more machine tools to meet military's needs . . . . p. 66

# Comparison of Prices

*(Effective June 19, 1956)*

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

| | June 19 1956 | June 12 1956 | May 22 1956 | June 21 1955 |
|---|---|---|---|---|
| **Flat-Rolled Steel:** (per pound) | | | | |
| Hot-rolled sheets | 4.325¢ | 4.325¢ | 4.325¢ | 4.05¢ |
| Cold-rolled sheets | 5.325 | 5.325 | 5.325 | 4.95 |
| Galvanized sheets (10 ga.) | 5.85 | 5.85 | 5.85 | 5.45 |
| Hot-rolled strip | 4.325 | 4.325 | 4.325 | 4.05 |
| Cold-rolled strip | 6.28 | 6.28 | 6.28 | 5.79 |
| Plate | 4.52 | 4.52 | 4.52 | 4.225 |
| Plates, wrought iron | 10.40 | 10.40 | 10.40 | 9.30 |
| Stainl's C-R strip (No. 302) | 44.50 | 44.50 | 44.50 | 41.50 |
| **Tin and Terneplate:** (per base box) | | | | |
| Tinplate (1.50 lb.) cokes | $9.85 | $9.85 | $9.85 | $9.05 |
| Tinplates, electro (0.50 lb.) | 8.55 | 8.55 | 8.55 | 7.75 |
| Special coated mfg. ternes | 9.10 | 9.10 | 9.10 | 7.85 |
| **Bars and Shapes:** (per pound) | | | | |
| Merchant bars | 4.65¢ | 4.65¢ | 4.65¢ | 4.30¢ |
| Cold finished bars | 5.90 | 5.90 | 5.90 | 5.40 |
| Alloy bars | 5.65 | 5.65 | 5.65 | 5.075 |
| Structural shapes | 4.60 | 4.60 | 4.60 | 4.25 |
| Stainless bars (No. 302) | 38.25 | 38.25 | 38.25 | 35.50 |
| Wrought iron bars | 11.50 | 11.50 | 11.50 | 10.40 |
| **Wire:** (per pound) | | | | |
| Bright wire | 6.60¢ | 6.60¢ | 6.60¢ | 5.75¢ |
| **Rails:** (per 100 lb.) | | | | |
| Heavy rails | $4.725 | $4.725 | $4.725 | $4.45 |
| Light rails | 5.65 | 5.65 | 5.65 | 5.35 |
| **Semifinish Steel:** (per net ton) | | | | |
| Rerolling billets | $68.50 | $68.50 | $68.50 | $64.00 |
| Slabs, rerolling | 68.50 | 68.50 | 68.50 | 64.00 |
| Forging billets | 84.50 | 84.50 | 84.50 | 78.00 |
| Alloy blooms, billets, slabs | 96.00 | 96.00 | 96.00 | 86.00 |
| **Wire Rod and Skelp:** (per pound) | | | | |
| Wire rods | 5.025¢ | 5.025¢ | 5.025¢ | 4.675¢ |
| Skelp | 4.225 | 4.225 | 4.225 | 3.90 |
| **Finished Steel Composite:** (per pound) | | | | |
| Base price | 5.179¢ | 5.179¢ | 5.179¢ | 4.797¢ |

| | June 19 1956 | June 12 1956 | May 22 1956 | June 21 1955 |
|---|---|---|---|---|
| **Pig Iron:** (per gross ton) | | | | |
| Foundry del'd Phila. | $65.26 | $65.26 | $65.26 | $61.19 |
| Foundry Valley | 60.50 | 60.50 | 60.50 | 56.50 |
| Foundry, Southern Cin'ti | 62.93 | 62.93 | 62.93 | 60.43 |
| Foundry, Birmingham | 55.00 | 55.00 | 55.00 | 52.88 |
| Foundry, Chicago | 60.50 | 60.50 | 60.50 | 56.50 |
| Basic del'd Philadelphia | 64.48 | 64.48 | 64.48 | 60.27 |
| Basic, Valley furnace | 60.00 | 60.00 | 60.00 | 56.00 |
| Malleable, Chicago | 60.50 | 60.50 | 60.50 | 56.50 |
| Malleable, Valley | 60.50 | 60.50 | 60.50 | 56.50 |
| Ferromanganese‡, cents per lb. | 9.50¢ | 9.50¢ | 9.50¢ | 9.50¢ |
| ‡ 74.76 pct Mn base. | | | | |
| **Pig Iron Composite:** (per gross ton) | | | | |
| Pig iron | $60.29 | $60.29 | $60.29 | $56.59 |
| **Scrap:** (per gross ton) | | | | |
| No. 1 steel, Pittsburgh | $44.50 | $44.50 | $48.50 | $35.50 |
| No. 1 steel, Phila. area | 46.50 | 46.50 | 51.50 | 37.00 |
| No. 1 steel, Chicago | 43.50 | 43.50 | 49.00 | 33.50 |
| No. 1 bundles, Detroit | 37.50 | 37.50 | 46.50 | 27.00 |
| Low phos., Youngstown | 48.50 | 50.50 | 54.50 | 35.00 |
| No. 1 mach'y cast, Pittsburgh | 54.50 | 55.50 | 56.50 | 43.50 |
| No. 1 mach'y cast, Philadel'a | 54.50 | 54.50 | 55.50 | 44.50 |
| No. 1 mach'y cast, Chicago | 48.50 | 48.50 | 51.50 | 46.50 |
| **Steel Scrap Composite:** (per gross ton) | | | | |
| No. 1 heavy melting scrap | $44.83 | $44.83 | $49.67 | $35.33 |
| **Coke, Connellsville:** (per net ton at oven) | | | | |
| Furnace coke, prompt | $14.50 | $14.50 | $14.50 | $13.25 |
| Foundry coke, prompt | 17.50 | 17.50 | 17.50 | 16.25 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electrolytic, Conn. | $46.00 | $46.00 | $46.00 | $36.00 |
| Copper, Lake, Conn. | 46.00 | 46.00 | 46.00 | 36.00 |
| Tin, Straits, New York | 94.625† | 94.00 | 96.875 | 94.50 |
| Zinc, East St. Louis | 13.50 | 13.50 | 13.50 | 12.50 |
| Lead, St. Louis | 15.80 | 15.80 | 15.80 | 14.80 |
| Aluminum, virgin ingot | 25.90 | 25.90 | 25.90 | 23.20 |
| Nickel, electrolytic | 64.50 | 64.50 | 64.50 | 67.67 |
| Magnesium, ingot | 34.50 | 34.50 | 34.50 | 29.25 |
| Antimony, Laredo, Tex. | 33.00 | 33.00 | 33.00 | 28.50 |

† Tentative. ‡ Average. * Revised.

**Finished Steel Composite**

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite**

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

**Steel Scrap Composite**

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on p. 176→

| Producing Point | Basic | Fdry. | Mall. | Bess. | Low Phos. |
|---|---|---|---|---|---|
| Bethlehem *B3* | 62.00 | 62.50 | 63.00 | 63.50 | ..... |
| Birdsboro, Pa. *B6* | 62.00 | 62.50 | 63.00 | 63.50 | ..... |
| Birmingham *R3* | 54.50 | 55.00* | ..... | ..... | ..... |
| Birmingham *W9* | 54.50 | 55.00* | 59.00 | ..... | ..... |
| Birmingham *U4* | 54.50 | 55.00* | 59.00 | ..... | ..... |
| Buffalo *R3* | 60.00 | 60.50 | 61.00 | 61.50 | ..... |
| Buffalo *H1* | 60.00 | 60.50 | 61.00 | ..... | ..... |
| Buffalo *W6* | 60.00 | 60.50 | 61.00 | 61.50 | ..... |
| Chester *C17* | 62.00 | 62.50 | 63.00 | ..... | ..... |
| Chicago *I4* | 60.00 | 60.50 | 60.50 | 61.00 | ..... |
| Cleveland *A5* | 60.00 | 60.50 | 60.50 | 61.00 | 65.00† |
| Cleveland *R3* | 60.00 | 60.50 | 60.50 | 61.00 | ..... |
| Duluth *I4* | 60.00 | 60.50 | 60.50 | 61.00 | 65.00 |
| Erie *I4* | 60.00 | 60.50 | 60.50 | 61.00 | 65.00 |
| Everett *M6* | ..... | 62.50 | 63.00 | ..... | ..... |
| Fontana *K1* | 67.50 | 68.00 | ..... | ..... | ..... |
| Geneva, Utah *C7* | 60.00 | 60.50 | ..... | ..... | ..... |
| Granite City *G2* | 61.90 | 62.40 | 62.90 | ..... | ..... |
| Hubbard *Y1* | ..... | ..... | 60.50 | ..... | ..... |
| Lone Star *L3* | ..... | 55.00 | ..... | ..... | ..... |
| Midland *C11* | 60.00 | ..... | ..... | ..... | ..... |
| Minnequa *C6* | 62.00 | 62.50 | 63.00 | ..... | ..... |
| Monessen *P6* | 60.00 | ..... | ..... | ..... | ..... |
| Neville Is. *P4* | 60.00 | 60.50 | 60.50 | 61.00 | 65.00† |
| N. Tonawanda *T1* | ..... | 60.50 | 61.00 | 61.50 | ..... |
| Pittsburgh *U1* | 60.00 | ..... | 60.50 | 61.00 | ..... |
| Sharpsville *S3* | 60.00 | 60.50 | 60.50 | 61.00 | ..... |
| So. Chicago *R3* | 60.00 | ..... | 60.50 | ..... | ..... |
| Steelton *B3* | 62.00 | 62.50 | 63.00 | 63.50 | 68.00 |
| Swedeland *A2* | 62.00 | 62.50 | 63.00 | 63.50 | ..... |
| Toledo *I4* | 60.00 | 60.50 | 60.50 | 61.00 | ..... |
| Troy, N. Y. *R3* | 62.00 | 62.50 | 63.00 | 63.50 | 68.00 |
| Youngstown *Y1* | ..... | ..... | 60.50 | 61.00 | ..... |

**DIFFERENTIALS:** Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos.

Silvery Iron: Buffalo, *H1*, $70.25; Jackson, *J1, G1*, $69.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

## STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

| Product | 201 | 202 | 301 | 302 | 303 | 304 | 316 | 321 | 347 | 410 | 416 | 430 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ingots, reroll. | 18.50 | 19.75 | 19.25 | 20.50 | — | 21.75 | 33.00 | 26.50 | 35.25 | 15.00 | — | 15.25 |
| Slabs, billets, reroll. | 23.00 | 25.50 | 23.75 | 26.25 | 26.75 | 27.50 | 41.75 | 33.50 | 44.50 | 19.50 | — | 19.75 |
| Forg. dcs., die blks., rgs. | — | — | — | — | — | — | — | — | — | — | — | — |
| Billets, forging | — | 31.00 | 31.75 | 32.00 | 34.75 | 33.75 | 52.75 | 39.75 | 52.50 | 25.50 | 26.00 | 26.00 |
| Bars, struct. | — | 36.75 | 38.00 | 38.25 | 41.00 | 40.25 | 62.75 | 47.25 | 62.00 | 30.50 | 31.00 | 31.00 |
| Plates | — | 38.75 | 40.00 | 40.25 | 42.75 | 43.00 | 66.00 | 51.25 | 66.75 | 31.75 | 33.00 | 32.25 |
| Sheets | 42.25 | 42.50 | 44.25 | 44.50 | 52.25 | 47.25 | 70.25 | 56.25 | 75.50 | 36.25 | — | 36.75 |
| Strip, hot-rolled | 31.00 | 33.50 | 32.00 | 34.50 | — | 37.25 | 59.75 | 45.75 | 61.25 | 28.00 | — | 28.75 |
| Strip, cold-rolled | 39.00 | 42.50 | 41.00 | 44.50 | — | 47.25 | 76.25 | 56.25 | 75.50 | 36.25 | — | 36.75 |
| Wire CF, HR; Rod HR | — | — | 36.00 | 36.25 | 39.00 | 38.25 | 59.75 | 45.00 | 59.00 | 29.00 | 29.50 | 29.50 |

STAINLESS STEEL PRODUCING POINTS:

*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2* (2.25¢ lower on Type 430), *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5*.

*Strip:* Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa. *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3*,(.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

*Bar:* Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5*.

*Wire:* Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2*.

*Structurals:* Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11*.

*Plates:* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5*.

*Forged discs, die blocks, rings:* Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2*.

*Forgings billets:* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5*.

# Uncertainty Keeps Market Dull

**Limited activity results as outcome of steel negotiations is awaited by buyers and sellers . . . Mills put hold on orders after the end of this week.**

◆ UNCERTAINTY about the outcome of the labor negotiations is reflected again this week in the scrap market.

There is limited activity. Mills are placing holds on orders after the end of this week, while brokers and dealers are trying to guess how the market will be next month. The clouded conditions of the union-management talks give them little indication of what to expect.

While the prices of No. 1 heavy melting, No. 1 bundles and No. 1 busheling are off $1 to $2 in some areas, they held firm in others. THE IRON AGE Composite did not change, remaining at last week's level of $44.83.

Sellers, in the face of the hold on orders, were kept busy getting orders out. In some cases, they were trying to change destination points to find homes for some shipments that were held up.

Mills were concerned with getting supplies of scrap to keep furnaces going. However, they were anxious to avoid huge demurrage bills in the event of a strike.

**Pittsburgh** . . . Prices of openhearth scrap grades are unchanged here as the market continues to show little activity. Scrap collections are off by as much as 40 pct, yard stocks are low and shipments on June orders are lagging. There were reports that higher prices were being offered for fast delivery, but there is no large scale push for shipments. Everyone is sitting back and watching the steel labor talks.

**Chicago** . . . In a relatively dull market, Chicago scrap prices hung fire generally waiting results of negotiations. A sprinkling of dealers were laying in small stocks of scrap for a quickened market tempo following the completion of negotiations, with the thought that if a strike did develop, the post strike business levels would probably boost scrap prices sufficiently to make any scrap in hand, purchased at present prices, a good investment. This is still not general, however, and heavy tonnages continue to move on old orders, keeping scrap in the yards in scant supply. The result is that consumers are paying well over the most recent mill purchase price for electric furnace grades, and even offers to buy turnings are being refused at present price levels. The correct price for factory bundles last week was not $44-45, as listed, but $49-50.

**Philadelphia** . . . Sales reported this week were almost all spot cars at quoted levels. Only exception was representative transaction for shoveling turnings, down $1 to $36. Most of the mills in the area have established end of this week as cutoff date for deliveries of scrap. Dealers are really moving to meet this deadline, consequently little or no scrap is building up in dealers' yards.

**New York** . . . Uncertainty is the only certain thing in this market at present. The confusion stems from unsettled steel labor negotiations, with mills trying to keep going while avoiding complications and huge demurrage bills in the event of a strike. Last week's buy by a large consumer in an adjacent consuming area has kept prices so far unchanged, but many fear the confused state of the market indicates declines.

**Detroit** . . . The market held firm this week despite the uncertainty about the outcome of steel labor negotiations. Brokers are still buying scrap against old orders, but must be through with shipments by June 22. July auto lists begin closing next week and prices will depend on the expected results of steel negotiations. There are no price changes.

**Cleveland** . . . Two Valley mills and one on fringes of the district bought electric furnace grades for $49, dropping price $2. In Cleveland several mills have put out hold orders with a resulting scramble by dealers and brokers to change destination points. With these last purchases almost all mills in the Cleveland Valley District have bought some tonnage during June with prices somewhat higher than dealers expected. Brokers are covering short sales, and in most cases dealers must offer heavy prime grades to unload secondary grades.

**Birmingham** . . . The openhearth scrap market continues dull. One mill gave brokers orders for limited tonnage $3 under presently quoted prices on an "if" basis, with a cancellation date of June 22, in order to test the market. Different brokers found a varied amount of resistance from dealers, but there was little enthusiasm and many turned down orders.

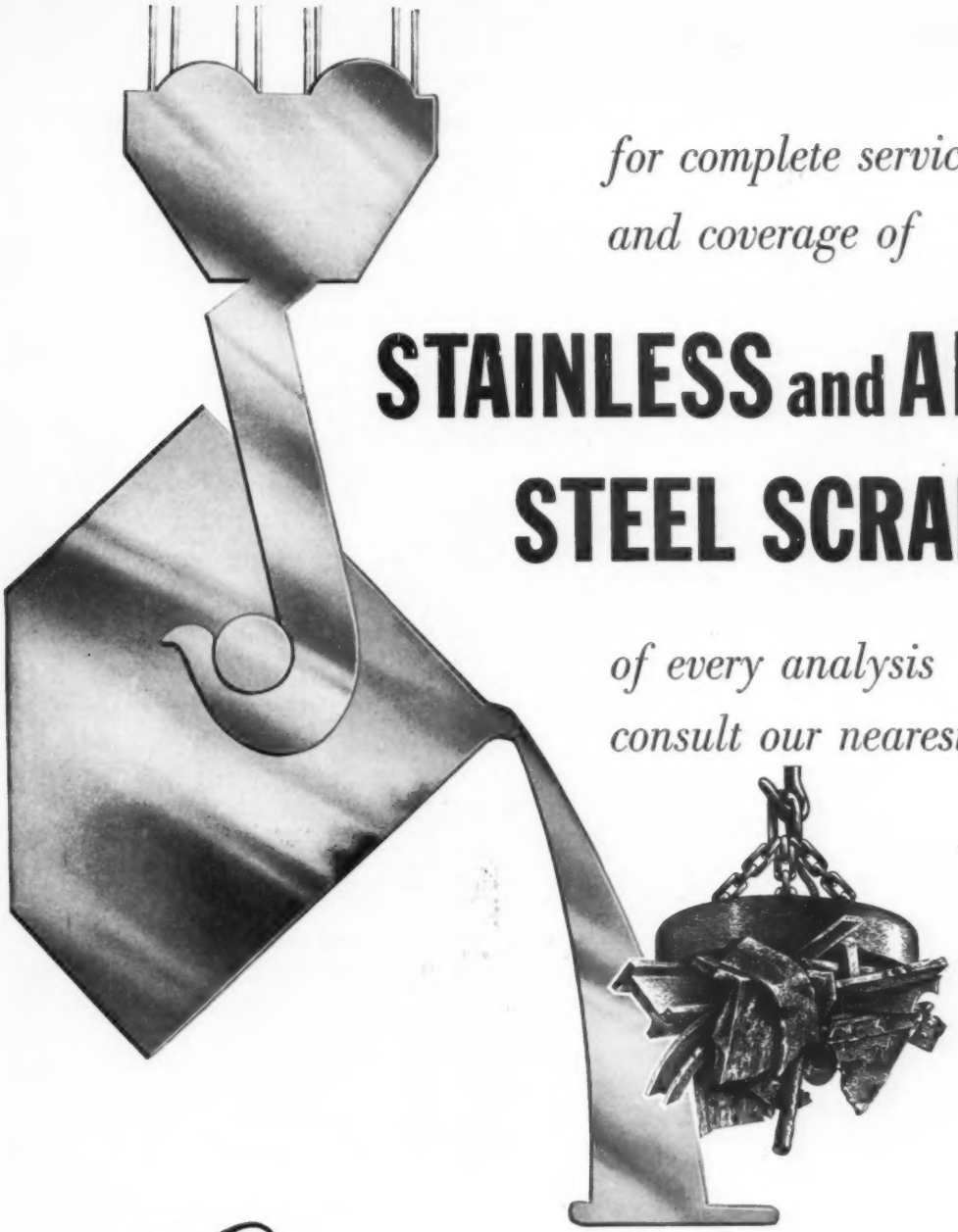
**St. Louis** . . . Buying of scrap has been halted waiting outcome of the negotiations between the unions and companies, with a weakening of the market. Most prices are unchanged. Because of the recent price declines the movement of material has decreased sharply.

**Cincinnati** . . . Aside from a few low priced nibbles from Pittsburgh, mid-month lull continues in area. Pittsburgh offerings are about $37-38 for No. 2 steel and $34-35 for No. 2 bundles. Local dealers feel Pittsburgh mills are attempting to tie up scrap for shipment after labor settlement, since at least 10 days is necessary to make delivery by barge. Collections have dropped and there is no dealer accumulation.

**Buffalo** . . . The market continues weak here with no activity. No new buying is expected until the end of the month—depending on the steel wage negotiations. Some dealers expect prices to be lower when purchases are made later. No price changes were recorded.

**Boston** . . . Market at virtual standstill pending outcome of the steel wage talks. No. 1 heavy melting, No. 1 bundles and No. 1 busheling all dropped a dollar to $35.

**West Coast** . . . Strike possibility casting a long shadow over scrap picture here. Some mills say they'll stop buying. In case of a strike, they don't want to be caught with freight car demurrage charges. Exporting continues fairly brisk in San Francisco and Los Angeles.



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IMPORT & EXPORT — **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

# Scrap Prices *(Effective June 19, 1956)*

## Iron and Steel Scrap

**Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.**

### Pittsburgh

| | |
|---|---|
| No. 1 hvy. melting | $44.00 to $45.00 |
| No. 2 hvy. melting | 39.00 to 40.00 |
| No. 1 bundles | 44.00 to 45.00 |
| No. 2 bundles | 36.00 to 37.00 |
| Machine shop turn. | 32.00 to 33.00 |
| Mixed bor. and ma. turn. | 32.00 to 33.00 |
| Shoveling turnings | 36.00 to 37.00 |
| Cast iron borings | 36.00 to 37.00 |
| Low phos. punch'gs plate | 51.00 to 52.00 |
| Heavy turnings | 42.00 to 43.00 |
| No. 1 RR. hvy. melting | 51.00 to 52.00 |
| Scrap rails, random lgth. | 62.00 to 63.00 |
| Rails 2 ft and under | 66.00 to 67.00 |
| R.R. steel wheels | 58.00 to 59.00 |
| RR. spring steel | 58.00 to 59.00 |
| RR. couplers and knuckles | 58.00 to 59.00 |
| No. 1 machinery cast | 54.00 to 55.00 |
| Cupola cast | 46.00 to 47.00 |
| Heavy breakable cast | 44.00 to 45.00 |

### Chicago

| | |
|---|---|
| No. 1 hvy. melting | $43.00 to $44.00 |
| No. 2 hvy. melting | 36.00 to 37.00 |
| No. 1 factory bundles | 49.00 to 50.00 |
| No. 1 dealers' bundles | 44.00 to 45.00 |
| No. 2 dealers' bundles | 32.00 to 33.00 |
| Machine shop turn. | 22.00 to 23.00 |
| Mixed bor. and turn. | 24.00 to 25.00 |
| Shoveling turnings | 24.00 to 25.00 |
| Cast iron borings | 24.00 to 25.00 |
| Low phos. forge crops | 54.00 to 55.00 |
| Low phos. punch'gs plate | 52.00 to 53.00 |
| Low phos. 3 ft and under | 50.00 to 52.00 |
| No. 1 RR. hvy. melting | 50.00 to 52.00 |
| Scrap rails, random lgth. | 61.00 to 62.00 |
| Rerolling rails | 69.00 to 70.00 |
| Rails 2 ft and under | 68.00 to 69.00 |
| Locomotive tires, cut | 55.00 to 56.00 |
| Cut bolsters & side frames | 55.00 to 56.00 |
| Angles and splice bars | 61.00 to 62.00 |
| RR. steel car axles | 68.00 to 70.00 |
| RR. couplers and knuckles | 54.00 to 55.00 |
| No. 1 machine cast | 48.00 to 49.00 |
| Cupola cast | 44.00 to 45.00 |
| Heavy breakable cast | 38.00 to 39.00 |
| Cast iron brake shoe | 38.00 to 39.00 |
| Cast iron wheel | 49.00 to 50.00 |
| Malleable | 58.00 to 59.00 |
| Stove plate | 41.00 to 42.00 |
| Steel car wheels | 54.00 to 56.00 |

### Philadelphia Area

| | |
|---|---|
| No. 1 hvy. melting | $46.00 to $47.00 |
| No. 2 hvy. melting | 37.00 to 38.00 |
| No. 1 bundles | 46.00 to 47.00 |
| No. 2 bundles | 35.00 to 36.00 |
| Machine shop turn. | 31.00 to 32.00 |
| Mixed bor. short turn. | 33.00 to 34.00 |
| Cast iron borings | 37.00 to 38.00 |
| Shoveling turnings | 35.00 to 36.00 |
| Clean cast chem. borings | 43.00 to 44.00 |
| Low phos. 5 ft and under | 50.00 to 51.00 |
| Low phos. 2 ft and under | 51.00 to 52.00 |
| Low phos. punch'gs | 51.00 to 52.00 |
| Elec. furnace bundles | 49.00 to 50.00 |
| Heavy turnings | 43.00 to 44.00 |
| RR. steel wheels | 58.00 to 59.00 |
| RR. spring steel | 58.00 to 59.00 |
| Rails 18 in. and under | 63.00 to 64.00 |
| Cupola cast | 47.00 to 48.00 |
| Heavy breakable cast | 50.00 to 51.00 |
| Cast iron car wheels | 57.00 to 58.00 |
| Malleable | 64.00 to 65.00 |
| Unstripped motor blocks | 38.00 to 39.00 |
| No. 1 machinery cast | 54.00 to 55.00 |

### Cleveland

| | |
|---|---|
| No. 1 hvy. melting | $45.00 to $46.00 |
| No. 2 hvy. melting | 37.00 to 38.00 |
| No. 1 bundles | 45.00 to 46.00 |
| No. 2 bundles | 33.00 to 34.00 |
| No. 1 busheling | 45.00 to 46.00 |
| Machine shop turn. | 30.00 to 31.00 |
| Mixed bor. and turn. | 34.00 to 35.00 |
| Shoveling turnings | 34.00 to 35.00 |
| Cast iron borings | 34.00 to 35.00 |
| Cut struct'r'l & plates, 2 ft & under | 51.00 to 52.00 |
| Drop forge flashings | 45.00 to 46.00 |
| Low phos. punch'gs, plate | 46.00 to 47.00 |
| Foundry steel, 2 ft & under | 49.00 to 50.00 |
| No. 1 RR. heavy melting | 50.00 to 51.00 |
| Rails 2 ft and under | 68.00 to 69.00 |
| Rails 18 in. and under | 69.00 to 70.00 |
| Railroad grate bars | 39.00 to 40.00 |
| Steel axle turnings | 35.00 to 36.00 |
| Railroad cast | 54.00 to 55.00 |
| No. 1 machinery cast | 54.00 to 55.00 |
| Stove plate | 51.00 to 52.00 |
| Malleable | 59.00 to 60.00 |

### Youngstown

| | |
|---|---|
| No. 1 hvy. melting | $47.00 to $48.00 |
| No. 2 hvy. melting | 36.00 to 37.00 |
| No. 1 bundles | 47.00 to 48.00 |
| No. 2 bundles | 34.00 to 35.00 |
| Machine shop turn. | 29.00 to 30.00 |
| Shoveling turnings | 33.00 to 34.00 |
| Cast iron borings | 33.00 to 34.00 |
| Low phos. plate | 48.00 to 49.00 |

### Buffalo

| | |
|---|---|
| No. 1 hvy. melting | $44.00 to $45.00 |
| No. 2 hvy. melting | 36.00 to 37.00 |
| No. 1 busheling | 44.00 to 45.00 |
| No. 1 bundles | 44.00 to 45.00 |
| No. 2 bundles | 33.00 to 34.00 |
| Machine shop turn. | 25.00 to 26.00 |
| Mixed bor. and turn. | 27.00 to 28.00 |
| Shoveling turnings | 27.00 to 28.00 |
| Cast iron borings | 27.00 to 28.00 |
| Low phos. plate | 53.00 to 54.00 |
| Scrap rails, random lgth. | 57.00 to 58.00 |
| Rails 2 ft and under | 65.00 to 66.00 |
| RR. steel wheels | 60.00 to 61.00 |
| RR. spring steel | 60.00 to 61.00 |
| RR. couplers and knuckles | 60.00 to 61.00 |
| No. 1 machinery cast | 50.00 to 51.00 |
| No. 1 cupola cast | 48.00 to 49.00 |

### Detroit

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $37.00 to $38.00 |
| No. 2 hvy. melting | 31.00 to 32.00 |
| No. 1 bundles, openhearth | 37.00 to 38.00 |
| No. 2 bundles | 26.50 to 27.50 |
| New busheling | 37.00 to 38.00 |
| Drop forge flashings | 36.50 to 37.50 |
| Machine shop turn. | 19.00 to 20.00 |
| Mixed bor. and turn. | 22.00 to 23.00 |
| Shoveling turnings | 22.00 to 23.00 |
| Cast iron borings | 22.00 to 23.00 |
| Low phos. punch'gs, plate | 37.00 to 38.00 |
| No. 1 cupola cast | 41.00 to 42.00 |
| Heavy breakable cast | 34.00 to 35.00 |
| Stove plate | 35.00 to 36.00 |
| Automotive cast | 44.00 to 45.00 |

### St. Louis

| | |
|---|---|
| No. 1 hvy. melting | $38.00 to $39.00 |
| No. 2 hvy. melting | 34.00 to 35.00 |
| No. 1 bundles | 40.00 to 41.00 |
| No. 2 bundles | 30.00 to 31.00 |
| Machine shop turn. | 22.00 to 23.00 |
| Cast iron borings | 24.00 to 25.00 |
| Shoveling turnings | 25.00 to 26.00 |
| No. 1 RR. hvy. melting | 48.50 to 49.50 |
| Rails, random lengths | 50.00 to 51.00 |
| Rails 18 in. and under | 62.00 to 63.00 |
| Locomotive tires uncut | 50.00 to 51.00 |
| Angles and splice bars | 50.00 to 51.00 |
| Std. steel car axles | 56.00 to 57.00 |
| RR. specialties | 54.00 to 55.00 |
| Cupola cast | 46.00 to 47.00 |
| Heavy breakable cast | 32.00 to 33.00 |
| Cast iron brake shoes | 42.00 to 43.00 |
| Stove plate | 40.00 to 41.00 |
| Cast iron car wheels | 43.00 to 44.00 |
| Rerolling rails | 65.00 to 66.00 |
| Unstripped motor blocks | 32.00 to 33.00 |

### Boston

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $34.00 to $35.00 |
| No. 2 hvy. melting | 26.00 to 26.50 |
| No. 1 bundles | 34.00 to 35.00 |
| No. 2 bundles | 25.00 to 25.50 |
| No. 1 busheling | 34.00 to 35.00 |
| Elec. furnace, 3 ft & under | 37.00 to 38.00 |
| Machine shop turn. | 20.00 to 20.50 |
| Mixed bor. and short turn. | 23.00 to 23.50 |
| Shoveling turnings | 24.00 to 24.50 |
| Clean cast chem. borings | 29.00 to 30.00 |
| No. 1 machinery cast | 42.50 to 43.00 |
| Mixed cupola cast | 36.00 to 37.00 |
| Heavy breakable cast | 39.50 to 40.50 |
| Stove plate | 35.00 to 36.00 |
| Unstripped motor blocks | 25.50 to 26.00 |

### New York

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $39.00 to $40.00 |
| No. 2 hvy. melting | 30.00 to 31.00 |
| No. 2 bundles | 28.00 to 29.00 |
| Machine shop turn. | 23.00 to 24.00 |
| Mixed bor. and turn. | 23.00 to 24.00 |
| Shoveling turnings | 28.00 to 29.00 |
| Clean cast chem. borings | 31.00 to 32.00 |
| No. 1 machinery cast | 47.00 to 47.50 |
| Mixed yard cast | 44.00 to 44.50 |
| Charging box cast | 44.00 to 44.50 |
| Heavy breakable cast | 44.00 to 44.50 |
| Unstripped motor blocks | 32.00 to 33.00 |

### Birmingham

| | |
|---|---|
| No. 1 hvy. melting | $34.00 to $35.00 |
| No. 2 hvy. melting | 32.00 to 33.00 |
| No. 1 bundles | 34.00 to 35.00 |
| No. 2 bundles | 24.00 to 25.00 |
| No. 1 busheling | 34.00 to 35.00 |
| Machine shop turn. | 25.00 to 26.00 |
| Shoveling turnings | 27.00 to 28.00 |
| Cast iron borings | 20.00 to 21.00 |
| Electric furnace bundles | 40.00 to 41.00 |
| Bar crops and plate | 51.00 to 52.00 |
| Structural and plate, 2 ft | 50.00 to 51.00 |
| No. 1 RR. hvy. melting | 45.00 to 46.00 |
| Scrap rails, random lgth. | 56.00 to 57.00 |
| Rails, 18 in. and under | 60.00 to 61.00 |
| Angles & splice bars | 55.00 to 56.00 |
| Rerolling rails | 65.00 to 66.00 |
| No. 1 cupola cast | 48.50 to 49.50 |
| Stove plate | 47.00 to 48.00 |
| Charging box cast | 32.00 to 33.00 |
| Cast iron car wheels | 39.00 to 40.00 |
| Unstripped motor blocks | 37.50 to 38.50 |
| Mashed tin cans | 15.00 to 16.00 |

### Cincinnati

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $42.50 to $43.50 |
| No. 2 hvy. melting | 33.50 to 34.50 |
| No. 1 bundles | 42.50 to 43.50 |
| No. 2 bundles | 31.50 to 32.50 |
| Machine shop turn. | 25.00 to 26.00 |
| Mixed bor. and turn. | 28.00 to 29.00 |
| Shoveling turnings | 29.00 to 30.00 |
| Cast iron borings | 28.00 to 29.00 |
| Low phos. 18 in. & under | 51.00 to 52.00 |
| Rails, random lengths | 57.00 to 58.00 |
| Rails, 18 in. and under | 64.00 to 65.00 |
| No. 1 cupola cast | 43.00 to 44.00 |
| Hvy. breakable cast | 43.00 to 44.00 |
| Drop broken cast | 52.00 to 53.00 |

### San Francisco

| | |
|---|---|
| No. 1 hvy. melting | $43.00 |
| No. 2 hvy. melting | 40.00 |
| No. 1 bundles | 42.00 |
| No. 2 bundles | 35.00 |
| No. 3 bundles | 29.00 |
| Machine shop turn. | 24.00 |
| Cast iron borings | 25.00 |
| No. 1 RR. hvy. melting | 43.00 |
| No. 1 cupola cast | 48.00 |

### Los Angeles

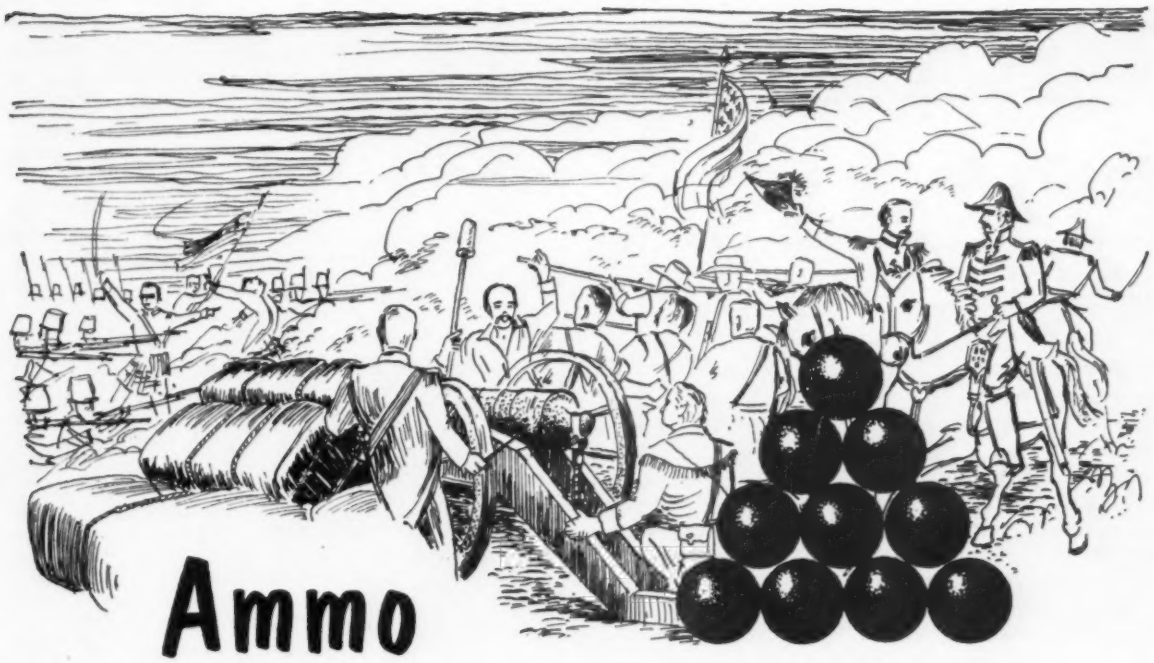
| | |
|---|---|
| No. 1 hvy. melting | $42.00 |
| No. 2 hvy. melting | 38.00 |
| No. 1 bundles | 41.00 |
| No. 2 bundles | 31.00 |
| No. 3 bundles | 27.00 |
| Machine shop turn. | $21.00 to 22.00 |
| Shoveling turnings | 24.00 |
| Cast iron borings | 24.00 |
| Elec. furn. 1 ft and under | 42.00 |
| No. 1 RR. hvy. melting | 42.00 |
| No. 1 cupola cast | 45.00 |

### Seattle

| | |
|---|---|
| No. 1 hvy. melting | $44.00 |
| No. 2 hvy. melting | 40.00 |
| No. 2 bundles | 31.00 |
| No. 3 bundles | 27.00 |
| No. 1 cupola cast | 45.00 |
| Mixed yard cast | 45.00 |

### Hamilton, Ont.

| | |
|---|---|
| No. 1 hvy. melting | $43.00 |
| No. 2 hvy. melting | 38.00 |
| No. 1 bundles | 43.00 |
| No. 2 bundles | 35.00 |
| Mixed steel scrap | 37.00 |
| Bushelings | 33.50 |
| Bush., new fact., prep'd | 41.00 |
| Bush., new fact., unprep'd | 37.00 |
| Machine shop turn. | 21.00 |
| Short steel turn. | 26.00 |
| Mixed bor. and turn. | 22.00 |
| Rails, rerolling | 51.00 |
| Cast scrap | 50.00 |



# Ammo

## *for "Old Hickory"*

On January 8, 1815, fifteen days after a peace treaty had been signed, General Jackson effectively fought from behind cotton bales to repulse the British at New Orleans. His ammunition, guns and howitzers came from Pittsburgh's first successful foundry—established in 1805 by Joseph McClurg, Joseph Smith and John Gormley—later known as McClurg's and McKnight's.

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# Phelps Dodge Signs 3-Year Pact

**International Mine, Mill and Smelter Workers agree to 3-year contract . . . Wages increase average of 24¢, granted in yearly installments . . . Industry optimistic.**

◆ ONE DOWN and three big ones to go. Phelps Dodge Corp. has signed a contract with International Union of Mine, Mill and Smelter Workers which should give this major copper producer an excellent chance for three years of strike-free operation. New contract becomes effective July 1.

Kennecott Copper Corp. is negotiating with the same union. No cause-for-alarm disagreements have arisen. Nothing definite is expected from Kennecott until next week, at the earliest.

The same holds true for American Smelting and Refining, except that a company spokesman indicated there was a chance of settlement late this week.

No word is expected from Anaconda—Mine, Mill and Smelter Workers negotiations, currently in progress, until near deadline time, June 30.

The most unusual feature of the Phelps Dodge agreement is the extension of the term of the contract to three years from the usual one year.

Companies have been proposing longer contract periods for the last several years. The union has turned the proposal down in the past in order to be free to discuss any point every year.

Cause of the change: the strong gauntlet bid by the United Steelworkers (IRON AGE, May 10, p. 152) to take over the smelter workers.

Traditionally, the union is most liable to attack immediately following a bargain session. USW usually claims that (a) the incumbent didn't get what it could have for the men, or (2) in case of a strike, that handling was clumsy and costly to workers.

By accepting a three-year agreement the Mine, Mill and Smelter union may have taken less than it could have obtained. Wage increases total about 24¢ per hour in three yearly installments. July 1, 1956 workers will get average of 10.1¢ more, 7.1¢ average in 1957 and 7.1¢ in 1958. Union also got improved benefit plan, retirement voluntary at 60, and improved health benefits. However, it will serve, the union hopes, to relieve the annual pressure from USW. And it will keep workers drawing full salaries for three solid years.

Orville Larson, International Mine, Mill and Smelter Workers vice-president, declared, "We feel the agreement will bring new stability . . . and eliminate the annual crisis and threat of a strike."

The Phelps Dodge settlement definitely establishes an optimistic air in the copper and copper consuming industries. Circumstances, rather than the fact of settlement, indicate an excellent possibility of amicable agreements by the other big three producers.

July orders for copper are off, somewhat over 20 pct. However this reflects the general 2 week shutdown by brass mills and most copper users.

## Daily Nonferrous Metal Prices

*(Cents per lb except as noted)*

| | June 13 | June 14 | June 15 | June 16 | June 18 | June 19 |
|---|---|---|---|---|---|---|
| Copper, electro, Conn. | 46.00 | 46.00 | 46.00 | 46.00 | 46.00 | 46.00 |
| Copper, Lake, delivered | 46.00 | 46.00 | 46.00 | 46.00 | 46.00 | 46.00 |
| Tin, Straits, New York | 94.25 | 95.00 | 95.625 | .... | 94.625 | 94.625* |
| Zinc, East St. Louis | 13.50 | 13.50 | 13.50 | 13.50 | 13.50 | 13.50 |
| Lead, St. Louis | 15.80 | 15.80 | 15.80 | 15.80 | 15.80 | 15.80 |

*Note: Quotations are going prices.* **Tentative*

**TIN . . .** Every year or so since the end of World War II, Congress has been quietly passing a law to keep the Texas City tin smelter in operation. True to form, it happened again in 1956. But this time not so quietly.

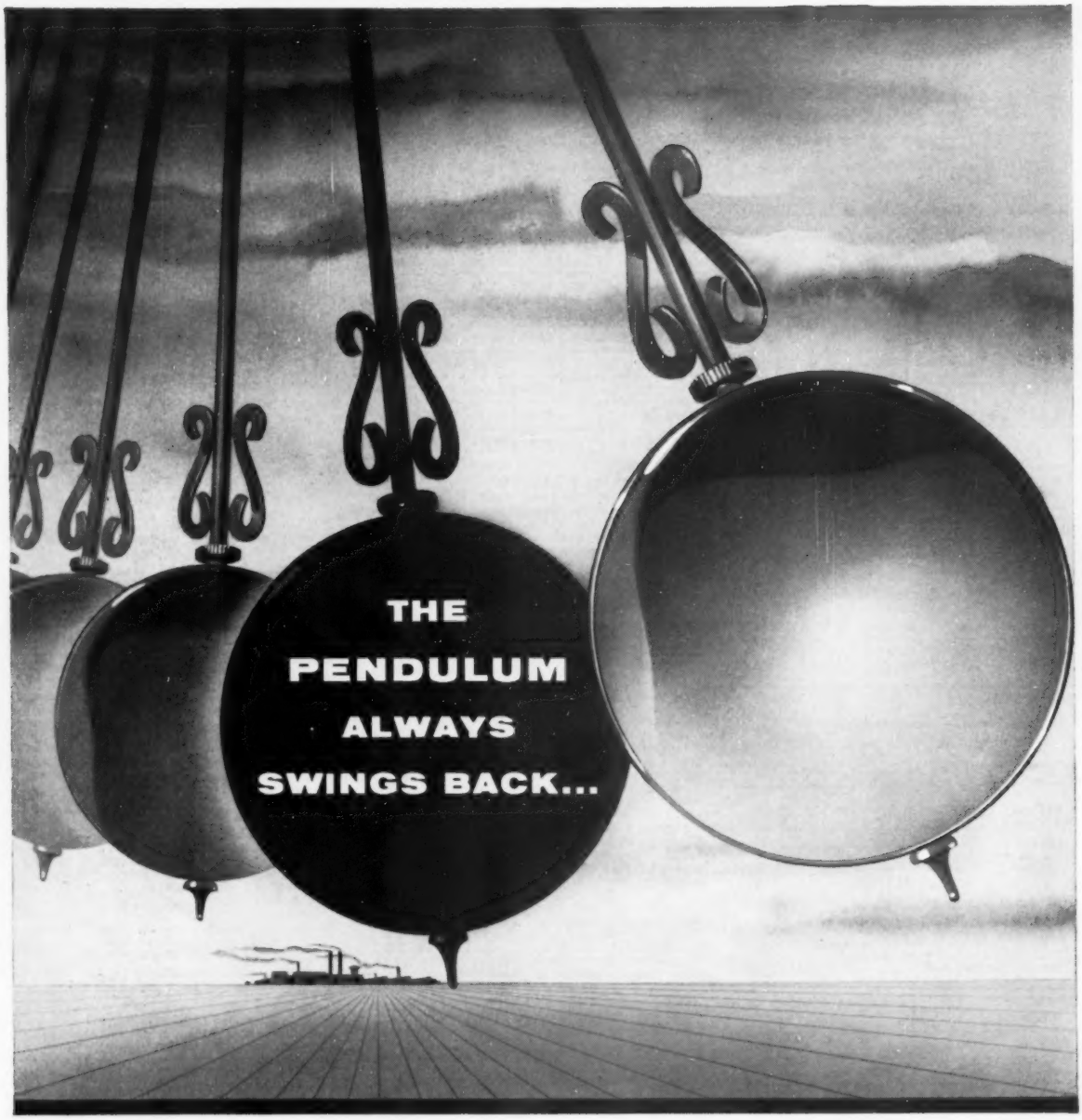
Senator Wayne Morse (Dem., Ore.), in defending the bill to keep the smelter in operation, maintains that closing the smelter would "place the nation's tin industry at the mercy of an international tin cartel."

Lynn W. Meekins, director of the Malayan Tin Bureau, took immediate exception to Senator Morse's view, declaring that "the Texas City Smelter itself is the only undertaking in the world's tin industry which might by some stretch of an aberrant imagination be said to resemble a cartel."

The Hoover Commission believes that the smelter should be sold to private industry. On the other hand, both Senate majority leader Lyndon Johnson (Dem., Tex.) and Speaker of the House Sam Rayburn (Dem., Tex.) have quietly thrown their weight in defense of continued operation. Actually, with government stockpile of tin rapidly approaching completion, the primary reason for the smelter's continued existence is waning. Local Texas businesses contracted to supply the smelter are the only ones currently profiting.

Meanwhile, the international tin agreement group was preparing to go into existence. One of the primary functions of the group will be to control excess fluctuations in price. A buffer stock is to be established from which tin may be sold when short supply pushes the price too high, and for which metal will be bought when market is oversupplied. Under the agreement, current price of tin would empower the manager of the buffer stock to buy if he saw fit. But current price is not low enough to compel him, by International Tin Agreement rules.

Malaya, world's chief producer, will make a cash contribution to the stock, which it will regain from industry by means of a tax.




Time tells this story over and over. Temporary pressures may lead to trial of "something just as good" as something you've relied upon for years. And most usually this trial only proves that there's no substitute for your first choice.

Just so, with Brass. There are countless uses in which Brass remains always unmatched because of its superior quality in machining, cold upsetting, and drawing, plus its profit-making customer appeal in marketing . . . and its durability in use.

By the same token, there are many manufacturers who will tell you that Bristol Brass is unmatched in its own right . . . for quality that never departs from specifications, and deliveries that never depart from schedule. So if you're using substitutes in strip, rod, wire, extrusions or forgings . . . put yourself on the solid Brass standard, *with Bristol.*

. . . and for BRASS FORGINGS, too . . . get them from **ACCURATE BRASS CORP.**
*(Subsidiary of The Bristol Brass Corporation)* now in a new and modern plant at Bristol, Connecticut

THE BRISTOL BRASS CORPORATION

*has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.*

"Bristol-Fashion" means **Brass at its Best**

# Nonferrous Prices *(Effective June 19, 1956)*

## MILL PRODUCTS

*(Cents per lb, unless otherwise noted)*

### ALUMINUM

*(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)*

**Flat Sheet (Mill Finish) and Plate**

*("F" temper except 6061-0)*

| Alloy | .032 | .081 | .136–.249 | .250–3. |
|---|---|---|---|---|
| 1100, 3003 | 42.3 | 40.2 | 39.0 | 38.0 |
| 5052 | 49.8 | 44.9 | 43.2 | 41.4 |
| 6061-0 | 46.9 | 42.7 | 40.9 | 40.8 |

**Extruded Solid Shapes**

| Factor | 6063 T-5 | 6062 T-6 |
|---|---|---|
| 6–8 | 43.1–44.8 | 58.1–61.7 |
| 12–14 | 43.8–45.2 | 59.0–63.3 |
| 24–26 | 46.8–47.2 | 69.2–73.6 |
| 36–38 | 55.1–55.7 | 92.0–95.8 |

**Screw Machine Stock—2011-T-3**

| Size* | ¼ | ⅜–⅝ | ¾–1 | 1¼–1⅝ |
|---|---|---|---|---|
| Price | 56.0 | 54.9 | 53.6 | 51.6 |

**Roofing Sheet, Corrugated**

(Per sheet, 26" wide base, 16,000 lb)

| Length"→ | 72 | 96 | 120 | 144 |
|---|---|---|---|---|
| .019 gage | $1.310 | $1.742 | $2.175 | $2.605 |
| .024 gage | 1.630 | 2.177 | 2.707 | 3.247 |

### MAGNESIUM

*(f.o.b. shipping pt., carload frt. allowed)*

**Sheet and Plate**

| Type→ Gage→ | .250–3.00 | .250–2.00 | .188 | .081 | .032 |
|---|---|---|---|---|---|
| FS1 Stand. Grade | ..... | 65.6 | 66.5 | 75 | 100 |
| FS1 Spec. | ..... | 88.9 | 91.1 | 103.5 | 163.1 |
| Tread Plate | ..... | 67.8 | 68.9 | ..... | ..... |
| Tooling Plate | 70.2 | ..... | ..... | ..... | ..... |

**Extruded Shapes**

| Factor→ | 6–8 | 12–14 | 24–26 | 36–38 |
|---|---|---|---|---|
| Comm. Grade (FS) | 66.4–69.0 | 67.5–69.6 | 72.1–72.7 | 84.9–85.8 |
| Spec. Grade (AZ31B) | 81.4–84.0 | 82.5–84.6 | 87.1–87.7 | 99.9–100.6 |

**Alloy Ingot**

AZ91B (Die Casting) ..... 35 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 39.25(Velasco,Tex.)

### NICKEL, MONEL, INCONEL

*(Base prices, f.o.b. mill)*

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheet, CR | 102 | 83 | 99 |
| Strip, CR | 102 | 92 | 125 |
| Rod, Bar, HR | 87 | 74 | 93 |
| Angles, HR | 87 | 74 | 93 |
| Plate, HR | 97 | 87 | 95 |
| Seamless tube | 122 | 110 | 153 |
| Shot, blocks | ... | 71 | ... |

### COPPER, BRASS, BRONZE

*(Freight included on 500 lbs)*

| | Sheet | Wire | Rod | Tube |
|---|---|---|---|---|
| Copper | 68.63 | ..... | ..... | 68.82 |
| Brass, 70/30 | 56.60 | 57.14 | ..... | 59.51 |
| Brass, Low | 61.35 | 61.89 | 61.29 | 64.16 |
| Brass, R L | 63.07 | 63.61 | 63.01 | 65.88 |
| Brass, Naval | 59.80 | 65.06 | 54.11 | 62.96 |
| Munts Metal | 57.84 | 51.85 | 53.65 | ..... |
| Comm. Bs. | 65.33 | 65.87 | 65.27 | 67.89 |
| Mang. Bs. | 63.54 | 66.19 | 57.64 | ..... |
| Phos. Bs. 5% | 86.79 | 84.44 | 87.29 | ..... |

### TITANIUM

(10,000 *lb base, f.o.b. mill*)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

## PRIMARY METAL

*(Cents per lb, unless otherwise noted)*

Aluminum ingot, 99+%, 10,000 lb. freight alloyed ..... 25.90
Aluminum pig ..... 24.00
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be ..... $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley ..... 46.00
Copper, Lake, delivered ..... 46.00
Gold, U. S. Treas., per troy oz. ..... $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. $100 to $120
Lead, St. Louis ..... 15.80
Lead, New York ..... 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig ..... 33.75
ingot ..... 34.50
Magnesium, sticks, 100 to 500 lb. 56.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $260 to $262
Nickel electro ..... 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel ..... 60.75
Palladium, dollars per troy oz. $23 to $24
Platinum, dollars per troy oz. $103 to $105
Silver, New York, cents per troy oz. 90.25
Tin, New York ..... 94.625*
Titanium sponge, grade A-1 $2.95 to $3.25
Zinc, East St. Louis ..... 13.50
Zinc, New York ..... 14.00
Zirconium sponge ..... $10.00
*Tentative

## REMELTED METALS

### Brass Ingot

*(Cents per lb delivered, carloads)*

85-5-5-5 ingot
No. 115 ..... 35.50
No. 120 ..... 34.25
No. 123 ..... 33.25
80-10-10 ingot
No. 305 ..... 38.75
No. 315 ..... 37.00
88-10-2 ingot
No. 210 ..... 50.25
No. 215 ..... 46.50
No. 245 ..... 41.50
Yellow ingot
No. 405 ..... 28.75
Manganese bronze
No. 421 ..... 31.25

### Aluminum Ingot

*(Cents per lb del'd 30,000 lb and over)*

95-5 aluminum-silicon alloys
0.30 copper max. ..... 25.75-26.25
0.60 copper max. ..... 25.50-26.00
Piston alloys (No. 122 type) 25.00-25.50
No. 12 alum. (No. 2 grade) 23.75-24.50
108 alloy ..... 24.00-24.50
195 alloy ..... 25.75-26.25
13 alloy (0.60 copper max.) 25.50-26.00
AXS-679 ..... 24.00-24.50

**Steel deoxidizing aluminum, notch bar granulated or shot**

Grade 1—95-97½% ..... 24.00-24.50
Grade 2—92-95% ..... 23.25-23.75
Grade 3—90-92% ..... 22.50-23.00
Grade 4—85-90% ..... 22.00-22.50

## SCRAP METALS

### Brass Mill Scrap

*(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)*

| | Heavy | Turnings |
|---|---|---|
| Copper | 42 | 41¼ |
| Yellow brass | 31¼ | 29 |
| Red brass | 37 | 36¼ |
| Comm. bronze | 38½ | 37⅝ |
| Mang. bronze | 28⅝ | 28⅛ |
| Yellow brass rod ends | 31 | .... |

### Custom Smelters Scrap

*(Cents per pound carload lots, delivered to refinery)*

No. 1 copper wire ..... 33½
No. 2 copper wire ..... 32
Light copper ..... 29½
*Refinery brass ..... 29½
* Dry copper content.

### Ingot Makers Scrap

*(Cents per pound carload lots, delivered to refinery)*

No. 1 copper wire ..... 33½
No. 2 copper wire ..... 32
Light copper ..... 29½
No. 1 composition ..... 26⅛
No. 1 comp. turnings ..... 26
Hvy. yellow brass solids .... 18½
Brass pipe ..... 18½
Radiators ..... 20½

**Aluminum**

Mixed old cast. ..... 15 —16
Mixed new clips ..... 16 —17
Mixed turnings, dry ..... 15 —16

### Dealers' Scrap

*(Dealers' buying price, f.o.b. New York in cents per pound)*

**Copper and Brass**

No. 1 copper wire ..... 31½—32
No. 2 copper wire ..... 28½—29
Light copper ..... 26 —26½
New type shell cuttings ..... 26½—27
Auto radiators (unsweated) .. 17½—18
No. 1 composition ..... 23½—24
No. 1 composition turnings... 22½—23
Unlined red car boxes..... 18½—19½
Cocks and faucets ..... 19 —19½
Clean heavy yellow brass.... 16 —16½
Brass pipe ..... 20 —21½
New soft brass clippings .... 22½—23
No. 1 brass rod turnings..... 20 —20½

**Aluminum**

Alum. pistons and struts..... 6 — 7
Aluminum crankcases ..... 11 —11½
1100 (2S) aluminum clippings 15 —15½
Old sheet and utensils ..... 11 —11½
Borings and turnings..... 8 — 8½
Industrial castings ..... 11 —11½
2024 (24S) clippings ..... 12½—13

**Zinc**

New zinc clippings ..... 8 — 8½
Old zinc ..... 5 — 5½
Zinc routings ..... 3¾
Old die cast scrap ..... 2¾— 3

**Nickel and Monel**

Pure nickel clippings ..... $1.50-$1.75
Clean nickel turnings ..... $1.25
Nickel anodes ..... $1.50-$1.75
Nickel rod ends ..... $1.50-$1.75
New Monel clippings ..... 75-85
Clean Monel turnings ..... 60-70
Old sheet Monel ..... 65-75
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

**Lead**

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free ..... 4½

**Miscellaneous**

Block tin ..... 83 —84
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13½—14
Solder joints ..... 18½—19
Siphon tops ..... 48
Small foundry type ..... 15¾—16
Monotype ..... 15 —15½
Lino. and stereotype ..... 13½—14
Electrotype ..... 13 —13¼
Hand picked type shells ..... 10½—11
Lino. and stereo. dross ..... 5¾— 6
Electro. dross ..... 4¾— 5

IRON AGE

# STEEL PRICES

*(Effective June 19, 1956)*

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

| | | BILLETS, BLOOMS, SLABS | | | PILING | SHAPES STRUCTURALS | | | STRIP | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon Rerolling Net Ton | Carbon Forging Net Ton | Alloy Net Ton | Sheet Steel | Carbon | Hi Str. Low Alloy | Carbon Wide-Flange | Hot-rolled | Cold-rolled | Hi Str. H.R. Low Alloy | Hi Str. C.R. Low Alloy | Alloy Hot-rolled | Alloy Cold-rolled |
| EAST | Bethlehem, Pa. | | | $96.00 *B3* | | 4.65 *B3* | 6.80 *B3* | 4.65 *B3* | | | | | | |
| | Buffalo, N. Y. | $68.50 *B3* | $84.50 *R3, B3* | $96.00 *R3, B3* | 5.45 *B3* | 4.65 *B3* | 6.80 *B3* | 4.65 *B3* | 4.325 *R3,B3* | 6.25 *B3* 6.25 *R7,S10* | 6.425 *B3* | 9.10 *B3* | | |
| | Claymont, Del. | | | | | | | | | | | | | |
| | Harrison, N. J. | | | | | | | | | | | | | 13.45 *C11* |
| | Conshohocken, Pa. | | | | | | | | 4.375 *A2* | 6.30 *A2* | 6.425 *A2* | | | |
| | New Bedford, Mass. | | | | | | | | | 6.70 *R6* | | | | |
| | Johnstown, Pa. | $68.50 *B3* | $84.50 *B3* | $96.00 *B3* | | 4.65 *B3* | 6.80 *B3* | | | | | | | |
| | Boston, Mass. | | | | | | | | | 6.80 *T8* | | | | 13.80 *T8* |
| | New Haven, Conn. | | | | | | | | | 6.70 *D1 A5* | | | | |
| | Phoenixville, Pa. | | | | | 5.15 *P2* | | 5.15 *P2* | | | | | | |
| | Sparrows Pt., Md. | | | | | | | | 4.325 *B3* | 6.25 *B3* | 6.425 *B3* | 9.10 *B3* | | |
| | Bridgeport, Wallingford, Conn. | $73.50 *N8* | $89.50 *N8* | | | | | | 4.625 *N8* | 6.70 *W1* | | | 7.50 *N8* | |
| | Pawtucket, R. I. Worcester, Mass. | | | | | | | | | 6.80 *N7 A5* | | | | *A5* 13.80 *N7* |
| MIDDLE WEST | Alton, Ill. | | | | | | | | 4.50 *L1* | | | | | |
| | Ashland, Ky. | | | | | | | | 4.325 *A7* | | | | | |
| | Canton-Massillon, Dover, Ohio | | $86.50 *R3* | $96.00 *R3* | | | | | | | | | | 13.45 *G4* |
| | Chicago, Ill. | $68.50 *U1* | $84.50 *R3, U1,W8* | $96.00 *R3, U1,W8* | 5.45 *U1* | 4.60 *U1, W8* | 6.75 *U1, Y1* | 4.60 *U1* | 4.55 *A1* 4.325 *N4,W8* | 6.35 *A1,T8* | | | 7.20 *W8* | 13.45 *T8* |
| | Cleveland, Ohio | | | | | | | | | 6.25 *A5,J3* | | 9.30 *A5* | | 13.45 *A5* |
| | Detroit, Mich. | | | $96.00 *R5* | | | | | 4.425 *G3,M2* | 6.35 *D1,D2, G3,M2,P11* | 6.525 *G3* | 9.20 *D2, G3* | | |
| | Duluth, Minn. | | | | | | | | | | | | | |
| | Gary, Ind. Harbor, Indiana | $68.50 *U1* | $84.50 *U1* | $96.00 *U1, Y1* | 6.45 *I3* | 4.60 *U1 I3* | 6.75 *U1, I3* | | 4.325 *I3, U1,Y1* | 6.35 *I3* 6.25 *Y1* | 6.425 *I3, U1,Y1* | 9.30 *Y1* | 7.20 *Y1, U1* | |
| | Sterling, Ill. | | | | | | | | 4.425 *N4* | | | | | |
| | Indianapolis, Ind. | | | | | | | | | 6.40 *C5* | | | | |
| | Newport, Ky. | | | | | | | | | | | | 7.20 *N5* | |
| | Middletown, Ohio | | | | | | | | | 6.45 *A7* | | | | |
| | Niles, Warren, Ohio Sharon, Pa. | $68.50 *C10* | $84.50 *C1* | $96.00 *C10* | | | | | 4.325 *S1, R3* | 6.25 *S1, R3,T4* | 6.425 *S1, R3* | 9.10 *S1, R3* | 7.20 *S1* | 13.45 *S1* |
| | Pittsburgh, Pa. Midland, Pa. Butler, Pa. | $68.50 *U1, J3* | $84.50 *J3, U1,C11* | $96.00 *U1, C11* | 5.45 *U1* | 4.60 *U1, J3* | 6.75 *U1, J3* | 4.60 *U1* | 4.325 *P6* | 6.25 *S7,B4* | | | 7.20 *S9* | 13.45 *S9* |
| | Portsmouth, Ohio | | | | | | | | | | | | | |
| | Weirton, Wheeling, Follansbee, W. Va. | | | | | 4.60 *W3* | | | 4.325 *W3* | 6.25 *F3,W3* | 6.425 *W3* | 9.10 *W3* | | |
| | Youngstown, Ohio | | $84.50 *C10* | $96.00 *Y1, C10* | | | 6.75 *Y1* | | 4.325 *U1, Y1* | 6.25 *Y1,C5* | 6.425 *U1, Y1* | 9.30 *Y1* | 7.20 *U1, Y1* | 13.45 *C5* |
| WEST | Fontana, Cal | $78.00 *K1* | $94.00 *K1* | $117.00 *K1* | | 5.30 *K1* | 7.40 *K1* | 5.45 *K1* | 5.125 *K1* | 8.00 *K1* | 7.575 *K1* | | 8.95 *K1* | |
| | Geneva, Utah | | $84.50 *C7* | | | 4.60 *C7* | 6.75 *C7* | | | | | | | |
| | Kansas City, Mo. | | | | | 4.70 *S2* | 6.85 *S2* | | | | 6.675 *S2* | | 7.45 *S2* | |
| | Los Angeles, Torrance, Cal. | | $94.00 *B2* | $116.00 *B2* | | 5.30 *C7, B2* | 7.45 *B2* | | 5.875 *C7 B2* | 8.30 *C1* | | | 8.40 *B2* | |
| | Minnequa, Colo. | | | | | 4.90 *C6* | | | 5.425 *C6* | | | | | |
| | Portland, Ore. | | | | | 5.35 *O2* | | | | | | | | |
| | San Francisco, Niles, Pittsburg, Cal. | | $94.00 *B2* | | | 5.25 *B2, P9* | 7.40 *B2* | | 5.875 *B2, C7* | | | | | |
| | Seattle, Wash. | | $98.00 *B2* | | | 5.35 *B2* | 7.50 *B2* | | 5.325 *B2* | | | | | |
| SOUTH | Atlanta, Ga. | | | | | | | | 4.525 *A8* | | | | | |
| | Fairfield, Ala. City, Birmingham, Ala. | $68.50 *T2* | $84.50 *T2* | | | 5.10 *C16* 4.60 *R3,T2* | 6.75 *T2* | | 4.325 *R3,T2* 4.825 *C10* | | 6.425 *T2* | | | |
| | Houston, Lone Star, Texas | $74.50 *L3* | $89.50 *S2* | $101.00 *S2* | | 4.70 *S2* | 6.85 *S2* | | | | 6.675 *S2* | | 7.45 *S2* | |

# STEEL PRICES

*(Effective June 19, 1956)*

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

| | | SHEETS | | | | | | | | | WIRE ROD | TINPLATE† | | BLACK PLATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hot-rolled *18* ga. & hvyr. | Cold-rolled | Galvanized *10* ga. | Enameling *12* ga. | Long Terne *10* ga. | Hi Str. Low Alloy H.R. | Hi Str. Low Alloy C.R. | Hi Str. Low Alloy Galv. | Hot rolled *19* ga. | | Cokes* *1.25*-lb. base box | Electro* *0.25*-lb. base box | Holloware Enameling *29* ga. |
| EAST | Bethlehem, Pa. | | | | | | | | | | | | | |
| | Buffalo, N. Y. | 4.325 *B3* | 5.325 *B3* | | | | 6.375 *B3* | 7.875 *B3* | | | 5.375 *W6* | † Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢. | | |
| | Claymont, Del. | | | | | | | | | | | | | |
| | Coatesville, Pa. | | | | | | | | | | | | | |
| | Conshohocken, Pa. | 4.375 *A2* | 5.375 *A2* | | | | 6.425 *A2* | | | | | | | |
| | Harrisburg, Pa. | | | | | | | | | | | | | |
| | Hartford, Conn. | | | | | | | | | | | | | |
| | Johnstown, Pa. | | | | | | | | | | 5.375 *B3* | | | |
| | Fairless, Pa. | 4.375 *U1* | 5.375 *U1* | | | | 6.425 *U1* | 7.925 *U1* | | | | $9.70 *U1* | $8.40 *U1* | |
| | New Haven, Conn. | | | | | | | | | | | | | |
| | Phoenixville, Pa. | | | | | | | | | | | | | |
| | Sparrows Pt., Md. | 4.325 *B3* | 5.325 *B3* | 5.85 *B3* | | | 6.375 *B3* | 7.875 *B3* | 8.60 *B3* | | 5.475 *B3* | $9.70 *B3* | $8.40 *B3* | |
| | Worcester, Mass. | | | | | | | | | | 5.675 *A5* | | | |
| | Trenton, N. J. | | | | | | | | | | | | | |
| MIDDLE WEST | Alton, Ill. | | | | | | | | | | 5.55 *L1* | | | |
| | Ashland, Ky. | 4.325 *A7* | | 5.85 *A7* | 5.90 *A7* | | | | | | | | | |
| | Canton-Massillon, Dover, Ohio | | | 5.85 *R1, R3* | | | | | | | | | | |
| | Chicago, Joliet, Ill. | 4.55 *A1* 4.325 *W8* | | | | | 6.375 *U1* | | | | 5.375 *N4* 5.375 *A5, R3* | | | |
| | Sterling, Ill. | | | | | | | | | | 5.475 *N4* | | | |
| | Cleveland, Ohio | 4.325 *J3, R3* | 5.325 *J3, R3* | | 5.90 *R3* | | 6.375 *J3, R3* | 7.875 *J3, R3* | | | 5.375 *A5* | | | |
| | Detroit, Mich. | 4.425 *G3, M2* | 5.425 *G3* 5.325 *M2* | | | | 6.475 *G3* | 7.975 *G3* | | | | | | |
| | Newport, Ky. | 4.325 *N5* | 5.325 *N5* | 5.85 *N5* | | | | | | | | | | |
| | Gary, Ind. Harbor, Indiana | 4.325 *I3, U1, Y1* | 5.325 *I3, U1, Y1* | 5.85 *U1, I3* | 5.90 *U1, I3* | 6.25 *U1* | 6.375 *Y1, U1, I3* | 7.875 *U1, Y1* | | | 5.375 *Y1* | $9.60 *I3, U1, Y1* | $8.30 *I3, U1, Y1* | 7.05 *U1, Y1* |
| | Granite City, Ill. | 4.525 *G2* | 5.525 *G2* | 6.05 *G2* | 6.10 *G2* | | | | | | | | $8.40 *G2* | 7.15 *G2* |
| | Kokomo, Ind. | | | 5.95 *C9* | | | | | | | 5.475 *C9* | | | |
| | Mansfield, Ohio | 4.325 *E2* | 5.325 *E2* | | | 6.25 *E2* | | | | | | | | |
| | Middletown, Ohio | | 5.325 *A7* | 5.85 *A7* | 5.90 *A7* | 6.25 *A7* | | | | | | | | |
| | Niles, Warren, Ohio Sharon, Pa. | 4.325 *S1, R3, N3* | 5.325 *R3, N3* | 5.85 *R3* 6.85 *N3* | 5.90 *N3* | 6.25 *N3* | 6.375 *S1, R3* | 7.875 *R3* | | | | | $8.30 *R3* | |
| | Pittsburgh, Pa. Midland, Pa. Butler, Pa. | 4.325 *J3, U1, P6* | 5.325 *J3, U1, P6* | 5.85 *U1* | 5.90 *U1, A7* | | 6.375 *J3, U1* | 7.875 *U1* | 8.60 *U1* | | 5.825 *P6* 5.375 *A5* | $9.60 *J3, U1* | $8.30 *J3, U1* | 7.05 *U1* |
| | Portsmouth, Ohio | 4.325 *P7* | 5.325 *P7* | | | | | | | | 5.375 *P7* | | | |
| | Weirton, Wheeling, Follansbee, W. Va. | 4.325 *W3, W5* | 5.325 *W3, W5, F3* | 5.85 *W3, W5* | | 6.25 *W3, W5* | 6.375 *W3* | 7.875 *W3* | | | | $9.60 *W3, W5* | $8.30 *W3, W5* | 7.05 *F3, W5* |
| | Youngstown, Ohio | 4.325 *U1, Y1* | 5.325 *Y1* | | 5.90 *Y1* | | 6.375 *U1, Y1* | 7.875 *Y1* | | | 5.375 *Y1* | | | |
| WEST | Fontana, Cal. | 5.125 *K1* | 6.525 *K1* | | | | 7.175 *K1* | 9.075 *K1* | | | | $10.35 | $9.05 | $8.15 |
| | Geneva, Utah | 4.425 *C7* | | | | | | | | | | | | |
| | Kansas City, Mo. | | | | | | | | | | 5.625 *S2* | | | |
| | Los Angeles, Torrance, Cal. | | | | | | | | | | 6.175 *B2* | | | |
| | Minnequa, Colo. | | | | | | | | | | 5.625 *C6* | | | |
| | San Francisco, Niles, Pittsburg, Cal. | 5.025 *C7* | 6.275 *C7* | 6.60 *C7* | | | | | | | 5.675 *C7* | $10.35 *C7* | $9.05 *C7* | |
| | Seattle, Wash. | | | | | | | | | | | | | |
| SOUTH | Atlanta, Ga. | | | | | | | | | | | | | |
| | Fairfield, Ala. Alabama City, Ala. | 4.325 *R3, T2* | 5.325 *T2* | 5.85 *R3, T2* | | | 6.375 *T2* | | | 5.625 *R3* | 5.025 *R3* 5.375 *T2* | $9.70 *T2* | $8.40 *T2* | |
| | Houston, Tex. | | | | | | | | | | 5.625 *S2* | | | |

IRON AGE

# STEEL PRICES

*(Effective June 19, 1956)*

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

| | | BARS | | | | | | PLATES | | | | WIRE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon Steel | Reinforcing | Cold Finished | Alloy Hot-rolled | Alloy Cold Drawn | Hi Str. H.R. Low Alloy | Carbon Steel | Floor Plate | Alloy | Hi Str. Low Alloy | Mfr's. Bright |
| EAST | Bethlehem | | | | 5.575 *B3* | 7.425 *B3* | 6.80 *B3* | | | | | |
| | Buffalo, N. Y. | 4.65 *B3,R3* | 4.65 *B3,R3* | 6.30 *B5* | 5.575 *B3,R3* | 7.425 *B3,B5* | 6.80 *B3* | 4.50 *B3,R3* | | | | 6.60 *W6* |
| | Claymont, Del. | | | | | | | 5.35 *C4* | | 6.30 *C4* | 6.725 *C4* | |
| | Coatesville, Pa. | | | | | | | 4.80 *L4* | | 6.30 *L4* | 6.725 *L4* | |
| | Conshohocken, Pa. | | | | | | | 4.50 *A2* | 5.575 *A2* | | 6.725 *A2* | |
| | Harrisburg, Pa. | | | | | | | 5.10 *P2* | 5.575 *C3* | | | |
| | Hartford, Conn. | | | 6.75 *R3* | | 7.725 *R3* | | | | | | |
| | Johnstown, Pa. | 4.65 *B3* | 4.65 *B3* | | 5.575 *B3* | | 6.80 *B3* | 4.50 *B3* | | 6.30 *B3* | 6.725 *B3* | 6.60 *B3* |
| | Fairless, Pa. | 4.80 *U1* | 4.80 *U1* | | 5.725 *U1* | | | | | | | |
| | Newark, N. J. | | | 6.70 *W10* | | 7.60 *W10* | | | | | | |
| | Camden, N. J. | | | 6.70 *P10* | | | | | | | | |
| | Bridgeport, Putnam, Conn. | 4.80 *N8* | | 6.80 *W10* | 5.725 *N8* | | | 4.750 *N8* | | | | |
| | Sparrows Pt., Md. | | 4.65 *B3* | | | | | 4.50 *B3* | | 6.30 *B3* | 6.725 *B3* | 6.70 *B3* |
| | Palmer, Worcester, Readville, Mass. Milton, Pa. | 4.80 *M7* | 4.80 *M7* | 6.70 *W11* 6.45 *C14* 6.70 *B5* | | 7.725 *A5,B5* | | 4.50 *R3* | | | | 6.90 *A5* 6.90 *W6* |
| | Spring City, Pa. | | | 6.35 *K4* | | 7.60 *K4* | | | | | | |
| MIDDLE WEST | Alton, Ill. | 4.85 *L1* | | | | | | | | | | 6.775 *L1* |
| | Ashland, Newport, Ky. | | | | | | | 4.50 *A7,N5* | | 6.30 *N5* | | |
| | Canton-Massillon, Mansfield, Ohio | 4.75 *R3* | | 6.25 *R2,R3* | 5.575 *R3,T5* | 7.425 *R2,R3, T5* | | 4.50 *E1* | | | | |
| | Chicago, Joliet, Ill. | 4.65 *U1, N4,W8,R3,* 5.15 *P13* | 4.65 *N4,R3,* 5.15 *P13* | 6.25 *B5,W8, W10,A5,L2* | 5.575 *U1,R3, W8* | 7.425 *A5,W8, W10,L2,B5* | | 4.50 *U1,W8, I3,R3* 4.725 *A1* | 5.575 *U1* | 6.30 *U1* | 6.725 *U1* | 6.60 *A5,R3, N4,W7* |
| | Cleveland, Ohio | 4.65 *R3* | 4.65 *R3* | 6.25 *A5,C13* | | 7.425 *A5,C13* | 6.80 *R3* | 4.60 *J3,R3* | 5.575 *J3* | | 6.725 *R3,J3* | 6.60 *A5, C13* |
| | Detroit, Mich. | 4.75 *G3* | 4.75 *G3* | 5.90 *R5* 6.45 *B5* 6.50 *P3* 6.10 *P8* | 5.575 *R5* 5.675 *G3* | 7.425 *R5* 7.625 *B5,P3, P8* | 6.90 *G3* | 4.60 *G3* | | | 6.825 *G3* | |
| | Duluth, Minn. | | | | | | | | | | | 6.60 *A5* |
| | Gary, Ind. Harbor, Crawfordsville | 4.65 *I3, U1, Y1* | 4.65 *I3, U1, Y1* | 6.25 *M5,R3* | 5.575 *I3, U1, Y1* | 7.425 *M5, R3* | 6.80 *U1,I3, Y1* | 4.50 *I3, U1, Y1* | 5.575 *I3* | 6.30 *U1,Y1* | 6.725 *U1, I3,Y1* | 6.35 *M4* |
| | Granite City, Ill. | | | | | | | 4.70 *G2* | | | | |
| | Kokomo, Ind. | | | | | | | | | | | 6.70 *C9* |
| | Sterling, Ill. | 4.75 *N4* | 4.75 *N4* | | | | | | | | | 6.70 *N4* |
| | Niles, Warren, Ohio Sharon, Pa. | 4.65 *R3,C10* | | 6.25 *C10* | 5.75 *C10* | 7.425 *C10* | 6.80 *R3* | 4.50 *S1,R3* | | 6.30 *S1* | 6.725 *S1* | |
| | Pittsburgh, Pa. Midland, Pa. | 4.65 *J3, U1, C11* | 4.65 *J3, U1* | 6.25 *A5,C8, C11,J3, W10,B4,R3* | 5.575 *U1,C11* | 7.425 *A5,C11, W10,C8,R3* | 6.80 *J3, U1* | 4.50 *J3, U1* | 5.575 *U1* | 6.30 *U1* | 6.725 *J3, U1* | 6.60 *A5,J3, P6* |
| | Portsmouth, Ohio | | | | | | | | | | | 6.60 *P7* |
| | Weirton, Wheeling, Follansbee, W. Va. | 4.65 *W3* | | | | | | 4.50 *W3,W5* | | | | |
| | Youngstown, Ohio | 4.65 *U1,Y1, C10,R3* | 4.65 *U1,Y1, R3* | 6.25 *Y1, U1* | 5.575 *U1,Y1, C10* | 7.425 *Y1,C10, F2* | 6.80 *U1,Y1* | 4.50 *U1,Y1, R3* | | 6.30 *Y1* | 6.725 *Y1* | 6.60 *Y1* |
| WEST | Emeryville, Cal. | 5.40 *J5* | 5.40 *J5* | | | | | | | | | |
| | Fontana, Cal. | 5.35 *K1* | 5.35 *K1* | | 6.625 *K1* | | 7.50 *K1* | 5.20 *K1* | | 7.00 *K1* | 7.375 *K1* | |
| | Geneva, Utah | | | | | | | 4.50 *C7* | | | 6.725 *C7* | |
| | Kansas City, Mo. | 4.90 *S2* | 4.90 *S2* | | 5.825 *S2* | | 7.05 *S2* | | | | | 6.85 *S2* |
| | Los Angeles, Torrance, Cal. | 5.35 *B2,C7* | 5.35 *B2,C7* | 7.70 *R3* | 6.625 *B2* | | 7.50 *B2* | | | | 7.625 *B2* | 7.55 *B2* |
| | Minnequa, Colo. | 5.10 *C6* | 5.10 *C6* | | | | | 5.35 *C6* | | | | 6.85 *C6* |
| | Portland, Ore. | 5.40 *O2* | 5.40 *O2* | | | | | | | | | |
| | San Francisco, Niles, Pittsburg, Cal. | 5.35 *C7* 5.40 *B2,P9* | 5.35 *C7* 5.40 *B2,P9* | | | | 7.55 *B2* | | | | | 7.55 *C7* 7.55 *C6* |
| | Seattle, Wash. | 5.40 *B2,P12, N6* | 5.40 *B2,P12* | | | | 7.35 *B2* | 5.40 *B2* | | 7.20 *B2* | 7.625 *B2* | |
| SOUTH | Atlanta, Ga. | 5.15 *A8* | 5.15 *A8* | | | | | | | | | 6.80 *A8* |
| | Fairfield, Ala. City, Birmingham, Ala. | 4.65 *T2,R3* 5.15 *C16* | 4.65 *T2,R3* 5.15 *C16* | | | | 6.80 *T2* | 4.50 *T2,R3* | | | 6.725 *T2* | 6.60 *R3,T2* |
| | Houston, Ft. Worth, Lone Star, Tex. | 4.90 *S2* | 4.90 *S2* | | 5.825 *S2* | | 7.05 *S2* | 4.85 *L3* 4.60 *S2* | | 6.40 *S2* | 6.825 *S2* | 6.85 *S2* |

# Steel Prices *(Effective June 19, 1956)*

## Key to Steel Producers

With Principal Offices

*A1* Acme Steel Co., Chicago
*A2* Alan Wood Steel Co., Conshohocken, Pa.
*A3* Allegheny Ludlum Steel Corp., Pittsburgh
*A4* American Cladmetals Co., Carnegie, Pa.
*A5* American Steel & Wire Div., Cleveland
*A6* Angell Nail & Chaplet Co., Cleveland
*A7* Armco Steel Corp., Middletown, Ohio
*A8* Atlantic Steel Co., Atlanta, Ga.

*B1* Babcock & Wilcox Tube Div., Beaver Falls, Pa.
*B2* Bethlehem Pacific Coast Steel Corp., San Francisco
*B3* Bethlehem Steel Co., Bethlehem, Pa.
*B4* Blair Strip Steel Co., New Castle, Pa.
*B5* Bliss & Laughlin, Inc., Harvey, Ill.
*B6* Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

*C1* Calstrip Steel Corp., Los Angeles
*C2* Carpenter Steel Co., Reading, Pa.
*C3* Central Iron & Steel Co., Harrisburg, Pa.
*C4* Claymont Products Dept., Claymont, Del.
*C5* Cold Metal Products Co., Youngstown, O.
*C6* Colorado Fuel & Iron Corp., Denver
*C7* Columbia Geneva Steel Div., San Francisco
*C8* Columbia Steel & Shafting Co., Pittsburgh
*C9* Continental Steel Corp., Kokomo, Ind.
*C10* Copperweld Steel Co., Pittsburgh, Pa.
*C11* Crucible Steel Co. of America, Pittsburgh
*C12* Cumberland Steel Co., Cumberland, Md.
*C13* Cuyahoga Steel & Wire Co., Cleveland
*C14* Compressed Steel Shafting Co., Readville, Mass.
*C15* G. O. Carlson, Inc., Thorndale, Pa.
*C16* Connors Steel Div., Birmingham
*C17* Chester Blast Furnace, Inc., Chester, Pa.

*D1* Detroit Steel Corp., Detroit
*D2* Detroit Tube & Steel Div., Detroit
*D3* Driver Harris Co., Harrison, N. J.
*D4* Dickson Weatherproof Nail Co., Evanston, Ill.
*D5* Henry Disston & Sons, Inc., Philadelphia

*E1* Eastern Stainless Steel Corp., Baltimore
*E2* Empire Steel Co., Mansfield, O.

*F1* Firth Sterling, Inc., McKeesport, Pa.
*F2* Fitzsimmons Steel Corp., Youngstown
*F3* Follansbee Steel Corp., Follansbee, W. Va.

*G1* Globe Iron Co., Jackson, O.
*G2* Granite City Steel Co., Granite City, Ill.
*G3* Great Lakes Steel Corp., Detroit
*G4* Greer Steel Co., Dover, O.

*H1* Hanna Furnace Corp., Detroit

*I2* Ingersoll Steel Div., Chicago
*I3* Inland Steel Co., Chicago
*I4* Interlake Iron Corp., Cleveland

*J1* Jackson Iron & Steel Co., Jackson, O.
*J2* Jessop Steel Corp., Washington, Pa.
*J3* Jones & Laughlin Steel Corp., Pittsburgh
*J4* Joslyn Mfg. & Supply Co., Chicago
*J5* Judson Steel Corp., Emeryville, Calif.

*K1* Kaiser Steel Corp., Fontana, Cal.
*K2* Keystone Steel & Wire Co., Peoria
*K3* Koppers Co., Granite City, Ill.
*K4* Keystone Drawn Steel Co., Spring City, Pa

*L1* Laclede Steel Co., St. Louis
*L2* La Salle Steel Co., Chicago
*L3* Lone Star Steel Co., Dallas
*L4* Lukens Steel Co., Coatesville, Pa.

*M1* Mahoning Valley Steel Co., Niles, O.
*M2* McLouth Steel Corp., Detroit
*M3* Mercer Tube & Mfg. Co., Sharon, Pa.
*M4* Mid-States Steel & Wire Co., Crawfordsville, Ind.
*M5* Monarch Steel Div., Hammond, Ind.
*M6* Mystic Iron Works, Everett, Mass.
*M7* Milton Steel Products Div., Milton, Pa.

*N1* National Supply Co., Pittsburgh
*N2* National Tube Div., Pittsburgh
*N3* Niles Rolling Mill Div., Niles, O.
*N4* Northwestern Steel & Wire Co., Sterling, Ill.
*N5* Newport Steel Corp., Newport, Ky.
*N6* Northwest Steel Rolling Mills, Seattle
*N7* Newman Crosby Steel Co., Pawtucket, R. I.
*N8* Northeastern Steel Corp., Bridgeport, Conn.

*O1* Oliver Iron & Steel Co., Pittsburgh
*O2* Oregon Steel Mills, Portland

*P1* Page Steel & Wire Div., Monessen, Pa.
*P2* Phoenix Iron & Steel Co., Phoenixville, Pa.
*P3* Pilgrim Drawn Steel Div., Plymouth, Mich.
*P4* Pittsburgh Coke & Chemical Co., Pittsburgh
*P5* Pittsburgh Screw & Bolt Co., Pittsburgh
*P6* Pittsburgh Steel Co., Pittsburgh
*P7* Portsmouth Div., Detroit Steel Corp., Detroit
*P8* Plymouth Steel Co., Detroit
*P9* Pacific States Steel Co., Niles, Cal.
*P10* Precision Drawn Steel Co., Camden, N. J.
*P11* Production Steel Strip Corp., Detroit
*P12* Pacific Steel Rolling Mills, Seattle
*P13* Phoenix Mfg Co., Joliet, Ill.

*R1* Reeves Steel & Mfg. Co., Dover, O.
*R2* Reliance Div., Eaton Mfg. Co., Massillon, O.
*R3* Republic Steel Corp., Cleveland
*R4* Roebling Sons Co., John A., Trenton, N. J.
*R5* Rotary Electric Steel Co., Detroit
*R6* Rodney Metals, Inc., New Bedford, Mass.
*R7* Rome Strip Steel Co., Rome, N. Y.

*S1* Sharon Steel Corp., Sharon, Pa.
*S2* Sheffield Steel Corp., Kansas City
*S3* Shenango Furnace Co., Pittsburgh
*S4* Simonds Saw and Steel Co., Fitchburg, Mass.
*S5* Sweet's Steel Co., Williamsport, Pa.
*S6* Standard Forging Corp., Chicago
*S7* Stanley Works, New Britain, Conn.
*S8* Superior Drawn Steel Co., Monaca, Pa.
*S9* Superior Steel Corp., Carnegie, Pa.
*S10* Seneca Steel Service, Buffalo

*T1* Tonawanda Iron Div., N. Tonawanda, N. Y.
*T2* Tennessee Coal & Iron Div., Fairfield
*T3* Tennessee Products & Chem. Corp., Nashville
*T4* Thomas Strip Div., Warren, O.
*T5* Timken Steel & Tube Div., Canton, O.
*T6* Tremont Nail Co., Wareham, Mass.
*T7* Texas Steel Co., Fort Worth
*T8* Thompson Wire Co., Boston

*U1* United States Steel Corp., Pittsburgh
*U2* Universal-Cyclops Steel Corp., Bridgeville, Pa.
*U3* Ulbrich Stainless Steels, Wallingford, Conn.
*U4* U. S. Pipe & Foundry Co., Birmingham

*W1* Wallingford Steel Co., Wallingford, Conn.
*W2* Washington Steel Corp., Washington, Pa.
*W3* Weirton Steel Co., Weirton, W. Va.
*W4* Wheatland Tube Co., Wheatland, Pa.
*W5* Wheeling Steel Corp., Wheeling, W. Va.
*W6* Wickwire Spencer Steel Div., Buffalo
*W7* Wilson Steel & Wire Co., Chicago
*W8* Wisconsin Steel Co., S. Chicago, Ill.
*W9* Woodward Iron Co., Woodward, Ala.
*W10* Wyckoff Steel Co., Pittsburgh
*W11* Worcester Pressed Steel Co., Worcester, Mass.
*W12* Wallace Barnes Steel Div., Bristol, Conn.

*Y1* Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

**Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.**

| | BUTTWELD | | | | | | | | | | | | | | SEAMLESS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ½ In. | | ¾ In. | | 1 In. | | 1¼ In. | | 1½ In. | | 2 In. | | 2½-3 In. | | 2 In. | | 2½ In. | | 3 In. | | 3½-4 In. | |
| STANDARD T. & C. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. |
| Sparrows Pt. *B3* | 16.50 | 1.25 | 19.50 | 5.25 | 22.00 | 8.75 | 24.50 | 9.50 | 25.00 | 10.50 | 25.50 | 11.00 | 27.00 | 18.75 | | | | | | | | |
| Youngstown *R3* | 18.50 | 1.25 | 21.50 | 5.25 | 24.00 | 8.75 | 26.50 | 10.00 | 27.00 | 11.00 | 27.50 | 11.50 | 29.00 | 11.75 | | | | | | | | |
| Fontana *K1* | 6.00 | 13.25 | 9.00 | +9.25 | 11.50 | +5.75 | 14.00 | +4.00 | 14.50 | +3.00 | 15.00 | +2.50 | 16.50 | +1.75 | | | | | | | | |
| Pittsburgh *J3* | 18.50 | 1.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | 4.00 | +11. | 10.50 | +6.25 | 13.00 | +3.75 | 14.50 | +2.25 |
| Alton, Ill. *L1* | 16.50 | 1.25 | 19.50 | 5.25 | 22.00 | 8.75 | 24.50 | 9.50 | 25.00 | 10.50 | 25.50 | 11.00 | 27.00 | 10.75 | | | | | | | | |
| Sharon *M3* | 18.50 | 3.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | | | | | | | | |
| Fairless *N2* | 16.50 | 1.25 | 19.50 | 5.25 | 22.00 | 8.75 | 24.50 | 9.50 | 25.00 | 10.50 | 25.50 | 11.00 | 27.00 | 10.75 | | | | | | | | |
| Pittsburgh *N1* | 18.50 | 3.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | 4.00 | +11. | 10.50 | +6.25 | 13.00 | +3.75 | 14.50 | +2.25 |
| Wheeling *W5* | 18.50 | 3.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | | | | | | | | |
| Wheatland *W4* | 18.50 | 3.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | | | | | | | | |
| Youngstown *Y1* | 18.50 | 3.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | 4.00 | +11. | 10.50 | +6.25 | 13.00 | +3.75 | 14.50 | +2.25 |
| Indiana Harbor *Y1* | 17.50 | 2.25 | 20.50 | 6.25 | 23.00 | 9.75 | 25.50 | 10.00 | 26.00 | 11.50 | 26.50 | 12.00 | 28.00 | 11.75 | | | | | | | | |
| Lorain *N2* | 18.50 | 3.25 | 21.50 | 7.25 | 24.00 | 10.75 | 26.50 | 11.50 | 27.00 | 12.50 | 27.50 | 13.00 | 29.00 | 12.75 | 4.00 | +11. | 10.50 | +6.25 | 13.00 | +3.75 | 14.50 | +2.25 |
| EXTRA STRONG PLAIN ENDS | | | | | | | | | | | | | | | | | | | | | | |
| Sparrows Pt. *B3* | 21.00 | 7.25 | 25.00 | 11.25 | 27.00 | 14.75 | 27.50 | 13.50 | 28.00 | 14.50 | 28.50 | 15.00 | 29.00 | 13.75 | | | | | | | | |
| Youngstown *R3* | 23.00 | 7.25 | 27.00 | 11.25 | 29.00 | 14.75 | 29.50 | 14.00 | 30.00 | 15.00 | 30.50 | 15.50 | 31.00 | 14.75 | | | | | | | | |
| Fairless *N2* | 21.00 | 7.25 | 25.00 | 11.25 | 27.00 | 14.75 | 27.50 | 13.50 | 28.00 | 14.50 | 28.50 | 15.00 | 29.00 | 13.75 | | | | | | | | |
| Fontana *K1* | 10.50 | | 14.50 | | 16.50 | | 17.00 | | 17.50 | | 18.00 | | 18.50 | | | | | | | | | |
| Pittsburgh *J3* | 23.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | 5.50 | +8.50 | 13.00 | +2.75 | 15.50 | +0.25 | 20.50 | 4.75 |
| Alton, Ill. *L1* | 21.00 | 7.25 | 25.00 | 11.25 | 27.00 | 14.75 | 27.50 | 13.50 | 28.00 | 14.50 | 28.50 | 15.00 | 29.00 | 13.75 | | | | | | | | |
| Sharon *M3* | 23.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | | | | | | | | |
| Pittsburgh *N1* | 23.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | 5.50 | +8.50 | 13.00 | +2.75 | 15.50 | +0.25 | 20.50 | 4.75 |
| Wheeling *W5* | 23.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | | | | | | | | |
| Wheatland *W4* | 23.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | | | | | | | | |
| Youngstown *Y1* | 23.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | 5.50 | +8.50 | 13.00 | +2.75 | 15.50 | +0.25 | 20.50 | 4.75 |
| Indiana Harbor *Y1* | 22.00 | 8.25 | 26.00 | 12.25 | 28.00 | 15.75 | 28.50 | 14.50 | 29.00 | 15.50 | 29.50 | 16.00 | 30.00 | 14.75 | | | | | | | | |
| Lorain *N2* | 21.00 | 9.25 | 27.00 | 13.25 | 29.00 | 16.75 | 29.50 | 15.50 | 30.00 | 16.50 | 30.50 | 17.00 | 31.00 | 15.75 | 5.50 | +8.50 | 13.00 | +2.75 | 15.50 | +0.25 | 20.50 | 4.75 |

**Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.**

**Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.**

## TOOL STEEL

*F.o.b. mill*

| W | Cr | V | Mo | Co | per lb | SAE |
|---|---|---|---|---|---|---|
| 18 | 4 | 1 | — | — | $1.60 | T-1 |
| 18 | 4 | 1 | — | 5 | 2.305 | T-4 |
| 18 | 4 | 2 | — | — | 1.765 | T-2 |
| 1.5 | 4 | 1.5 | 8 | — | .96 | M-1 |
| 6 | 4 | 3 | 6 | — | 1.35 | M-3 |
| 6 | 4 | 2 | 5 | — | 1.105 | M-2 |

| | |
|---|---|
| High-carbon chromium | .77 D-3, D-5 |
| Oil hardened manganese | .42 O-2 |
| Special carbon | .39 W-1 |
| Extra carbon | .33 W-1 |
| Regular carbon | .275 W-1 |

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

## CLAD STEEL

Base prices, cents per lb f.o.b

| | Cladding | Plate (*A3, J2, L4*) 10 pct | Plate (*A3, J2, L4*) 15 pct | Plate (*A3, J2, L4*) 20 pct | Sheet (*I2*) 20 pct |
|---|---|---|---|---|---|
| Stainless Type | 304 | 30.30 | 33.15 | 36.05 | 32.50 |
| | 316 | 35.50 | 38.45 | 41.40 | 47.00 |
| | 321 | 32.00 | 34.85 | 37.75 | 37.25 |
| | 347 | 34.40 | 37.90 | 41.40 | 48.25 |
| | 405 | 25.80 | 29.60 | 33.35 | ..... |
| | 410, 430 | 25.30 | 29.10 | 32.85 | ..... |

CR Strip (S9) Copper, 10 pct, 2 sides, 42.15; 1 side, 38.40.

## ELECTRICAL SHEETS

| 22-Gage F.o.b. Mill Cents Per Lb | Hot-Rolled (Cut Lengths)* | Cold-Reduced (Coiled or Cut Length) Semi-Processed | Cold-Reduced (Coiled or Cut Length) Fully Processed |
|---|---|---|---|
| Field | 8.40 | 8.60 | ..... |
| Armature | 9.35 | 9.60 | 10.10 |
| Elect. | 9.95 | 10.20 | 10.70 |
| Motor | 10.95 | 11.20 | 11.70 |
| Dynamo | 11.85 | 12.10 | 12.60 |
| Trans. 72 | 12.80 | 13.05 | 13.55 |
| Trans. 65 | 13.35 | Grain Oriented | |
| Trans. 58 | 13.85 | Trans. 80 | 17.45 |
| Trans. 52 | 14.85 | Trans. 73 | 17.95 |

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

## LAKE SUPERIOR ORES

*51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.*

| | Gross Ton |
|---|---|
| Openhearth lump | $12.10 |
| Old range, bessemer | 11.25 |
| Old range, nonbessemer | 11.10 |
| Mesabi, bessemer | 11.00 |
| Mesabi, nonbessemer | 10.85 |
| High phosphorus | 10.85 |

## MERCHANT WIRE PRODUCTS

| F.o.b. Mill | Standard & Coated Nails Col | Woven Wire Fence 9–15½ ga. Col | "T" Fence Posts Col | Single Loop Bale Ties Col | Galv. Barbed and Twisted Barbless Wire Col | Merch. Wire Ann'ld ¢/lb. | Merch. Wire Galv. ¢/lb. |
|---|---|---|---|---|---|---|---|
| Alabama City *R3* | 152 | 162 | ... | 173 | 175 | 7.40 | 7.80 |
| Aliquippa, Pa. *J3* | 152 | 162 | ... | ... | ... | 7.40 | 7.80 |
| Atlanta *A8* | 154 | 167 | ... | 177 | 180 | 7.60 | 8.125 |
| Bartonville *K2** | 154 | 168 | ... | 175 | 181 | 7.60 | 8.20 |
| Buffalo *W6* | ... | ... | ... | ... | ... | 7.50 | 7.90 |
| Chicago, Ill. *N4*** | 152 | 166 | ... | 175 | 179 | 7.50 | 8.10 |
| Cleveland *A6* | 157 | ... | ... | ... | ... | 7.50 | ..... |
| Cleveland *A5* | ... | ... | ... | ... | ... | 7.40 | ..... |
| Crawfordsville *M4** | 154 | 168 | ... | 177 | 181 | 7.60 | 8.20 |
| Donora, Pa. *A5* | 152 | 162 | ... | 175 | 175 | 7.50 | 7.90 |
| Duluth *A5* | 152 | 162 | ... | 175 | 175 | 7.50 | 7.90 |
| Fairfield, Ala. *T2* | 152 | 162 | ... | 175 | 175 | 7.50 | 7.90 |
| Galveston *D4* | 157 | ... | ... | ... | ... | ... | ..... |
| Houston *S2* | 157 | 170 | ... | ... | 180 | 7.65 | 8.05 |
| Johnstown, Pa. *B3** | 152 | 166 | ... | ... | 175 | 7.40 | 7.80 |
| Joliet, Ill. *A5* | 152 | 162 | ... | 175 | 175 | 7.50 | 8.10 |
| Kokomo, Ind. *C9* | 154 | 154 | ... | 177 | 177 | 7.60 | 8.00 |
| Los Angeles *B2** | ... | ... | ... | ... | ... | 8.35 | 8.925 |
| Kansas City *S2* | 157 | 167 | ... | 178 | 180 | 7.65 | 8.05 |
| Minnequa *C6* | 157 | 167 | 162 | 178 | 180 | 7.65 | 8.05 |
| Monessen *P6* | 152 | 162 | ... | ... | ... | 7.40 | 7.80 |
| Moline, Ill. *R3* | ... | 162 | 162 | ... | ... | ... | ..... |
| Pittsburg, Cal. *C7* | 171 | 185 | ... | 199 | 195 | 8.45 | 8.85 |
| Portsmouth *P7* | ... | ... | ... | ... | ... | 7.50 | ..... |
| Rankin, Pa. *A5* | 152 | 162 | ... | ... | 175 | 7.40 | 7.90 |
| So. Chicago *R3* | 152 | 162 | 157 | 173 | 175 | 7.40 | 7.80 |
| S. San Francisco *C6* | ... | ... | ... | 197 | 195 | 8.35 | 8.75 |
| Sparrows Pt. *B3** | 154 | ... | ... | 175 | 181 | 7.60 | 8.20 |
| Struthers, O. *Y1* | ... | ... | ... | ... | ... | 7.50 | 8.00 |
| Worcester *A5* | 158 | ... | ... | ... | ... | 7.70 | 8.20 |
| Williamsport, Pa. *S5* | ... | ... | 160 | ... | ... | ... | ..... |

Galvanized products computed with zinc at 5¢ per lb
Exceptions: *zinc at 12.5¢ per lb; ** 13¢ zinc.

## C-R SPRING STEEL

| Cents Per Lb F.o.b. Mill | CARBON CONTENT 0.26–0.40 | 0.41–0.60 | 0.61–0.80 | 0.81–1.05 | 1.06–1.35 |
|---|---|---|---|---|---|
| Bristol, Conn. *W12* | ... | ... | 10.90 | 13.05 | 15.75 |
| Buffalo, N. Y. *R7* | 7.00 | 8.95 | 10.50 | 12.65 | 15.35 |
| Carnegie, Pa. *S9* | ... | 9.05 | 10.60 | 12.75 | 15.35 |
| Cleveland *A5* | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Detroit *D1* | 7.20 | 9.15 | 10.70 | 12.85 | ..... |
| Detroit *D2* | 7.20 | 9.15 | 10.70 | ... | ..... |
| Harrison, N. J. *C11* | ... | ... | 10.90 | 13.05 | 15.75 |
| Indianapolis *C5* | 7.15 | 9.10 | 10.50 | 12.65 | 15.35 |
| New Castle, Pa. *B4* | 7.00 | 8.95 | 10.50 | 12.65 | ..... |
| New Haven, Conn. *D1* | 7.55 | 9.35 | 10.90 | 13.05 | ..... |
| Pawtucket, R. I. *N7* | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Pittsburgh *S7* | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Riverdale, Ill. *A1* | 7.20 | 9.05 | 10.60 | 12.75 | 15.45 |
| Sharon, Pa. *S1* | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Trenton *R4* | ... | ... | ... | ... | ..... |
| Wallingford *W1* | 7.55 | 9.35 | 10.90 | 13.05 | 15.75 |
| Warren, Ohio *T4* | 7.00 | 8.95 | 10.50 | 12.65 | 15.35 |
| Weirton, W. Va. *W3* | 7.10 | 8.95 | 10.50 | ... | ..... |
| Worcester, Mass. *A5* | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Youngstown *C5* | 7.00 | 8.95 | 10.50 | 12.65 | 15.35 |

## BOILER TUBES

| $ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill | Size OD-In. | Size B.W. Ga. | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. | Elec. Weld C.D. |
|---|---|---|---|---|---|---|
| Babcock & Wilcox | 2 | 13 | 32.09 | 37.37 | 29.93 | ..... |
| | 2½ | 12 | 43.22 | 50.31 | 40.31 | ..... |
| | 3 | 12 | 49.90 | 58.10 | 46.55 | ..... |
| | 3½ | 11 | 58.26 | 67.83 | 54.34 | ..... |
| | 4 | 10 | 77.36 | 90.07 | 72.17 | ..... |
| National Tube | 2 | 13 | 32.09 | 37.37 | 29.93 | ..... |
| | 2½ | 12 | 43.22 | 50.31 | 40.31 | ..... |
| | 3 | 12 | 49.90 | 58.10 | 46.55 | ..... |
| | 3½ | 11 | 58.26 | 67.83 | 54.34 | ..... |
| | 4 | 10 | 77.36 | 90.07 | 72.17 | ..... |
| Pittsburgh Steel | 2 | 13 | 32.09 | 37.37 | ..... | ..... |
| | 2½ | 12 | 43.22 | 50.31 | ..... | ..... |
| | 3 | 12 | 49.90 | 58.10 | ..... | ..... |
| | 3½ | 11 | 58.26 | 67.83 | ..... | ..... |
| | 4 | 10 | 77.36 | 90.07 | ..... | ..... |

## WAREHOUSES

Metropolitan Price, dollars per 100 lb.

| Cities | City Delivery ‡ Charge | Sheets Hot-Rolled | Sheets Cold-Rolled | Sheets Galvanized (10 gage) | Strip Hot-Rolled | Strip Cold-Rolled | Plates | Shapes Standard Structural | Bars Hot-Rolled | Bars Cold-Finished | Alloy Bars Hot-Rolled 4615 As rolled | Alloy Bars Hot-Rolled 4140 Annealed | Alloy Bars Cold-Drawn 4615 As rolled | Alloy Bars Cold-Drawn 4140 Annealed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baltimore | $.10 | 7.31 | 8.32 | 8.37 | 7.65 | ..... | 7.63 | 7.93 | 7.61 | 8.62 | 14.38 | 13.44–13.96 | 16.36 | 16.29–16.49 |
| Birmingham | .15 | 6.80 | 7.93 | 8.85 | 7.06 | ..... | 6.99 | 7.28 | 7.08 | 9.35 | ..... | ..... | ..... | ..... |
| Boston | .10 | 8.22 | 9.17 | 10.42 | 8.31 | ..... | 8.51 | 8.37 | 8.37 | 9.96 | ..... | 13.76 | ..... | 16.81 |
| Buffalo | .15 | 7.35 | 8.40 | 10.16 | 7.50 | ..... | 7.80 | 7.75 | 7.50 | 8.05 | ..... | 13.65 | ..... | 16.70 |
| Chicago | .15 | 7.28 | 8.39 | 9.25 | 7.36 | ..... | 7.60 | 7.58 | 7.42 | 7.90 | ..... | 13.30 | ..... | 16.30 |
| Cincinnati | .15 | 7.40 | 8.38 | 9.10 | 7.60 | ..... | 7.89 | 8.05 | 7.66 | 8.30 | 13.59 | 13.55 | 16.44 | 16.60 |
| Cleveland | .15 | 7.28 | 8.39 | 9.10 | 7.46 | ..... | 7.77 | 7.91 | 7.48 | 8.15 | 13.41 | 13.36 | 16.26 | 16.41 |
| Denver | ..... | 8.60 | 10.76 | 11.22 | 8.90 | ..... | 8.60 | 8.75 | 8.90 | 9.82 | ..... | ..... | ..... | 17.97 |
| Detroit | .15 | 7.47 | 8.58 | 9.53 | 7.49 | ..... | 7.88 | 8.05 | 7.70 | 8.19 | 13.70 | 13.54 | 16.55 | 16.59 |
| Houston | ..... | 7.85 | 8.75 | 10.49 | 8.15 | ..... | 8.00 | 8.28 | 8.25 | 10.10 9.95 | 14.35 | 15.90 | 17.15 | 17.05 |
| Kansas City | .20 | 7.47 | 8.76 | 9.17 | 7.73 | ..... | 7.66 | 7.95 | 7.75 | 8.52 | 13.87 | 13.52 | 16.72 | 16.57 |
| Los Angeles | .10 | 8.25 | 10.10 | 11.10 | 8.60 | ..... | 8.85 | 8.40 | 8.25 | 11.00 | ..... | 14.50 | ..... | 18.10 |
| Memphis | .10 | 7.12 | 8.25 | ..... | 7.38 | ..... | 7.31 | 7.60 | 7.40 | 9.15 | ..... | ..... | ..... | ..... |
| Milwaukee | .15 | 7.37 | 8.48 | 9.34 | 7.45 | ..... | 7.69 | 7.75 | 7.51 | 8.09 | ..... | 13.29 | ..... | 16.39 |
| New Orleans | .15 | 7.20 | 8.35 | ..... | 7.45 | ..... | 7.40 | 7.70 | 7.50 | 9.55 | ..... | ..... | ..... | ..... |
| New York | .10 | 7.88 | 8.98 | 9.73 | 8.33 | ..... | 8.31 | 8.21 | 8.26 | 9.87 | ..... | 13.67 | ..... | 16.72 |
| Norfolk | .20 | 7.25 | ..... | ..... | 7.65 | ..... | 7.45 | 7.95 | 7.65 | 9.50 | ..... | ..... | ..... | ..... |
| Philadelphia | .10 | 7.44 | 8.54 | 9.51 | 8.00 | ..... | 7.82 | 7.85 | 7.83 | 8.62 | ..... | 13.45 | ..... | 16.50 |
| Pittsburgh | .15 | 7.28 | 8.39 | 9.55 | 7.46 | 9.25 | 7.60 | 7.58 | 7.42 | 8.15 | 13.85 | 13.30 | 16.25 | 16.20 |
| Portland | ..... | 7.80–8.60 | 8.80–10.15 | 10.65 | 8.00 | 7.95 | 7.75 | 7.85–8.15 | 7.95 | 12.20 | ..... | 15.00 | ..... | 17.50 |
| Salt Lake City | .20 | ..... | 10.60 | ..... | 9.35 | ..... | ..... | 9.20 | 9.15 | ..... | ..... | ..... | ..... | ..... |
| San Francisco | .10 | 8.30 | 9.75 | 10.25 | 8.45 | ..... | 8.40 | 8.35 | 8.25 | 11.55 | ..... | 14.50 | ..... | 18.00 |
| Seattle | .80 | 8.75 | 10.50 | 10.90 | 8.90 | ..... | 8.50 | 8.50 | 8.60 | 12.25 | ..... | 14.75 | ..... | 17.80 |
| St. Louis | .15 | 7.57 | 8.68 | 9.54 | 7.65 | ..... | 7.89 | 7.98 | 7.71 | 8.44 | ..... | 13.49 | ..... | 16.59 |
| St. Paul | .25 | 7.94 | 8.59–9.14 | 9.89 | 7.72 | ..... | 7.65 | 7.94 | 7.74 | 8.51 | ..... | 13.51 | ..... | 16.31 |

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions. (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

*Plus analysis charge. ‡Deduct for country delivery.

*(Effective June 19, 1956)*

*(Ferralloy prices, which appeared in the June 14th issue, will next be published in the issue of June 28th.)*

## RAILS, TRACK SUPPLIES

| F.o.b. Mill Cents Per Lb | No. 1 Std. Rails | Light Rails | Joint Bars | Track Spikes | Screw Spikes | Tie Plates | Track Bolts Untreated |
|---|---|---|---|---|---|---|---|
| Bessemer *U1* | 4.725 | 5.65 | 5.825 | .... | .... | .... | .... |
| So. Chicago *R3* | .... | .... | .... | 8.05 | .... | .... | .... |
| Ensley *T2* | 4.725 | 5.65 | .... | .... | .... | .... | .... |
| Fairfield *T2* | .... | 5.65 | .... | 8.05 | .... | 5.625 | .... |
| Gary *U1* | 4.725 | 5.65 | .... | .... | .... | 5.625 | .... |
| Ind. Harbor *I5* | 4.725 | .... | 5.825 | 8.05 | .... | 5.625 | .... |
| Ind. Harbor *Y1* | .... | .... | .... | 8.05 | .... | .... | .... |
| Johnstown *B3* | .... | 5.65 | .... | .... | .... | .... | .... |
| Joliet *U1* | .... | .... | 5.825 | .... | .... | .... | .... |
| Kansas City *S2* | .... | .... | .... | 7.90 | .... | .... | .... |
| Lackawanna *B3* | 4.725 | 5.65 | 5.825 | .... | .... | 5.625 | .... |
| Lebanon *B3* | .... | .... | .... | .... | .... | .... | 12.15 |
| Minnequa *C6* | 4.725 | 6.15 | 5.825 | 7.90 | .... | 5.625 | 12.15 |
| Pittsburgh *O1* | .... | .... | .... | .... | 11.90 | .... | 12.15 |
| Pittsburgh *P5* | .... | .... | .... | .... | .... | .... | 12.15 |
| Pittsburgh *J3* | .... | .... | .... | 8.05 | .... | .... | .... |
| Seattle *B2* | .... | .... | .... | 8.40 | .... | 5.775 | 12.65 |
| Steelton *B3* | 4.725 | .... | 5.825 | .... | .... | 5.625 | .... |
| Struthers *Y1* | .... | .... | .... | 8.05 | .... | .... | .... |
| Torrance *C7* | .... | .... | .... | .... | .... | 5.775 | .... |
| Williamsport *S5* | .... | 5.65 | .... | .... | .... | .... | .... |
| Youngstown *R3* | .... | .... | .... | 8.05 | .... | .... | .... |

## COKE

| | |
|---|---|
| Furnace, beehive (f.o.b. oven) Connellsville, Pa. | Net-Ton $14.50 |
| Foundry, beehive (f.o.b. oven) Connellsville, Pa. | $17.00 to $18.00 |
| Foundry, oven coke | |
| Buffalo, del'd | $28.75 |
| Chicago, f.o.b. | 27.00 |
| Detroit, f.o.b. | 27.50 |
| New England, del'd | 28.55 |
| Seaboard, N. J. f.o.b. | 26.75 |
| Philadelphia, f.o.b. | 26.50 |
| Swedeland, Pa., f.o.b. | 26.50 |
| Painesville, Ohio, f.o.b. | 27.50 |
| Erie, Pa., f.o.b. | 27.50 |
| Cleveland, del'd | 29.43 |
| Cincinnati, del'd | 28.59 |
| St. Paul, f.o.b. | 26.50 |
| St. Louis, f.o.b. | 28.50 |
| Birmingham, f.o.b. | 25.65 |
| Lone Star, Tex., f.o.b. | 19.50 |

## ELECTRODES

*Cents per lb f.o.b. plant, threaded, with nipples, unboxed.*

| GRAPHITE | | | CARBON* | | |
|---|---|---|---|---|---|
| Diam. (In.) | Length (In.) | Price | Diam. (In.) | Length (In.) | Price |
| 24 | 84 | 23.00 | 40 | 100, 110 | 9.90 |
| 20 | 72 | 22.25 | 35 | 110 | 9.90 |
| 16 to 18 | 72 | 22.50 | 30 | 110 | 10.05 |
| 14 | 72 | 23.00 | 24 | 72 to 84 | 10.30 |
| 12 | 72 | 23.50 | 20 | 90 | 10.10 |
| 10 | 60 | 24.25 | 17 | 72 | 10.35 |
| 7 | 60 | 24.50 | 14 | 72 | 10.85 |
| 5 | 60 | 27.25 | 12 | 60 | 11.75 |
| 4 | 40 | 30.25 | 10 | 60 | 11.80 |
| 3 | 40 | 32.00 | 8 | 60 | 12.10 |
| 2½ | 30 | 33.75 | | | |
| 2 | 24 | 52.50 | | | |

* Prices shown cover carbon nipples.

## ELECTROPLATING SUPPLIES

### Anodes

*(Cents per lb, frt allowed in quantity)*

| | |
|---|---|
| Copper | |
| Cast elliptical, 18 in. or longer, 5000 lb lots | 64.42 |
| Electrodeposited | 56.78 |
| Brass, 80-20, ball anodes, 2000 lb or more | 60.00 |
| Zinc, ball anodes, 2000 lb lots | 21.25 |
| (for elliptical add 2¢ per lb) | |
| Nickel, 99 pct plus, rolled carbon | 90.50 |
| (rolled depolarized add 3¢ per lb) | |
| Cadmium | $1.70 |
| Tin, ball anodes and elliptical | $1.06 to $1.10 |

### Chemicals

*(Cents per lb, f.o.b. shipping point)*

| | |
|---|---|
| Copper cyanide, 100 lb drum | 83.50 |
| Copper sulphate, 5 or more 100 lb bags, per cwt | 21.15 |
| Nickel salts, single, 4-100 lb bags | 33.25 |
| Nickel chloride, freight allowed, 300 lbs | 43.50 |
| Sodium cyanide, domestic, fob N. Y. 200 lb drums | 21.55 |
| (Philadelphia price 21.80) | |
| Zinc cyanide, 100 to 900 lb | 55.55 |
| Potassium cyanide, 100 lb drum N. Y. | 48.00 |
| Chromic acid, flake type, 1 to 20 100 lb drums | 30.25 |

## BOLTS, NUTS, RIVETS, SCREWS

*(Base discount, f.o.b. mill)*

### Machine and Carriage Bolt

| | Discounts Full case | Full case 20,000 lb. Quantity or more |
|---|---|---|
| ½ in. & smaller x 6 in. & shorter | 61 | 63 |
| Larger than ½ in. diam. and all diam. longer than 6 in. | 55 | 57 |
| Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter | 61 | 63 |
| Lag, all diam. x 6 in. & shorter | 61 | 63 |
| Lag, all diam. longer than 6 in. | 55 | 57 |
| Plow bolts | 61 | 63 |

### Nuts, Hex, HP, reg. & hvy.

| | | |
|---|---|---|
| ¾" or smaller | 64 | 66 |
| ⅞" to 1⅛" inclusive | 63 | 65 |
| 1¼" to 1½" inclusive | 65 | 67 |
| 1⅝" and larger | 61 | 63 |

### C.P. Hex, regular & hvy.

| | | |
|---|---|---|
| ¾" or smaller | 64 | 66 |
| ⅞" and larger | 61 | 63 |

### Hot Galv. Nuts (all types)

| | | |
|---|---|---|
| 1½" or smaller | 44 | 47 |

### Finished, Semi-finished, Hex Nuts

| | | |
|---|---|---|
| ¾" and smaller | 66 | 66 |
| ⅞" and larger | 63 | 63 |

Add 25% for less than case or keg quantity.

### Rivets

| | *Base per* 100 lb |
|---|---|
| ½ in. and larger | $9.95 |
| | *Pct Off List* |
| 7/16 in. and smaller | 32 |

### Cap Screws

| | *Discount* Bright Treated | *H.C. Heat* |
|---|---|---|
| New std. hex head, packaged | | |
| ¼" thru ½" diam. x 6" and shorter | 34 | 20 |
| 9/16" and ⅝" x 6" and smaller and shorter | 31 | 16 |
| ¾", ⅞", 1" x 6" and shorter | 9 | +11 |
| New std. hex head, bulk* | | |
| ¼" thru ½" diam. x 6" and shorter | 49 | 41 |
| 9/16" and ⅝" diam. x 6" and shorter | 43 | 39 |
| ¾", ⅞", 1" x 6" and shorter | 31 | 20 |

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

### Machine Screws & Stove Bolts

| | *Discount* Mach. Screws | Stove Bolts |
|---|---|---|
| Packaged, package list | 27 | 38 |
| Bulk, bulk list | | |
| *Quantity* | | |
| ¼-in. diam. & under — 25,000-200,000 | 20 | 61 |
| 5/16-in. diam. & larger — 15,000-100,000 | 20 | 61 |
| All diam. over 3 in. long — 5,000-100,000 | — | 61 |

### Machine Screw & Stove Bolt Nuts

| | *Discount* Hex | Square |
|---|---|---|
| Packaged, package list | 24 | 27 |
| Bulk, bulk list | | |
| *Quantity* | | |
| ⅜-in. diam. & smaller — 25,000-200,000 | 18 | 20 |

## CAST IRON WATER PIPE INDEX

| | |
|---|---|
| Birmingham | 113.1 |
| New York | 125.6 |
| Chicago | 127.5 |
| San Francisco-L. A. | 134.8 |

*Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.*

## REFRACTORIES

### Fire Clay Brick

*Carloads per* 1000

| | |
|---|---|
| First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) | $122.00 |
| No. 1 Ohio | ..... |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 114.00 |
| No. 2 Ohio | 98.00 |
| Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) | 18.00 |

### Silica Brick

| | |
|---|---|
| Mt. Union, Pa., Ensley, Ala. | $128.00 |
| Childs, Hays, Pa. | 138.00 |
| Chicago District | 138.00 |
| Western Utah | 144.00 |
| California | 151.00 |
| Super Duty | |
| Hays, Pa., Athens, Tex., Windham, Warren, O. | 145.00 |
| Curtner, Calif. | 163.00 |
| Silica cement, net ton, bulk, Eastern (except Hays, Pa.) | 21.00 |
| Silica cement, net ton, bulk, Hays, Pa. | 24.00 |
| Silica cement, net ton, bulk, Chicago District, Ensley, Ala. | 22.00 |
| Silica cement, net ton, bulk, Utah and Calif. | 32.00 |

### Chrome Brick

*Per net ton*

| | |
|---|---|
| Standard chemically bonded, Balt. | $91.00 |
| Standards chemically bonded, Curtner, Calif. | 101.25 |
| Burned, Balt. | 85.00 |

### Magnesite Brick

| | |
|---|---|
| Standard Baltimore | $114.00 |
| Chemically bonded, Baltimore | 102.00 |

### Grain Magnesite

St. ¾-in. grains

| | |
|---|---|
| Domestic, f.o.b. Baltimore in bulk fines removed | $64.00 |
| Domestic, f.o.b. Chewalah, Wash., Luning, Nev. | |
| in bulk | 40.00 |
| in sacks | 46.00 |

### Dead Burned Dolomite

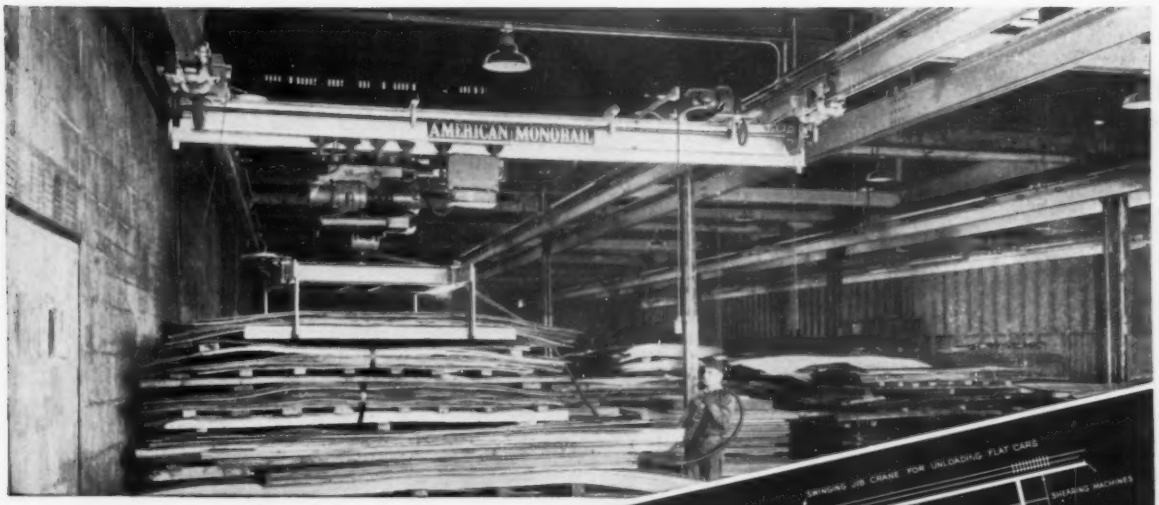
*Per net ton*

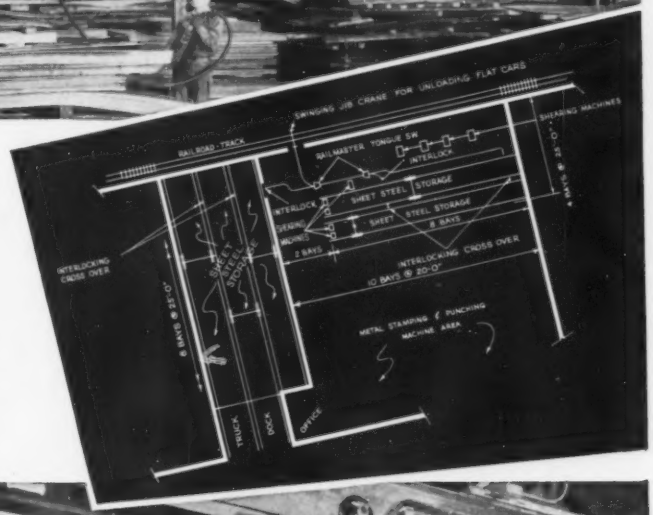
| | |
|---|---|
| F.o.b. bulk, producing points in: | |
| Pa., W. Va., Ohio | $15.00 |
| Midwest | 15.60 |
| Missouri Valley | 14.00 |

## METAL POWDERS

*Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.*

| | |
|---|---|
| Swedish sponge iron c.i.f. New York, ocean bags | 9.50¢ |
| Canadian sponge iron, Del'd in East, carloads | 9.5¢ |
| Domestic sponge iron, 98+% Fe, carload lots | 9.5¢ |
| Electrolytic iron, annealed, imported 99.5+% Fe | 27.5¢ |
| domestic 99.5+% Fe | 36.5¢ |
| Electrolytic iron, unannealed minus 325 mesh, 99+% Fe | 57.0¢ |
| Electrolytic iron melting stock, 99.84% pure | 22.0¢ |
| Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe | 86.0¢ to $1.55 |
| Aluminum freight allowed | 38.00¢ |
| Brass, 10 ton lots | 37.50¢ to 50.00¢ |
| Copper, electrolytic | 59.50¢ |
| Copper, reduced | 59.50¢ |
| Cadmium, 100-199 lb. 95¢ plus metal value | |
| Chromium, electrolytic 99.85% min. Fe .03 max. Del'd | $5.00 |
| Lead | 8.90¢ plus metal value |
| Manganese | 70.0¢ |
| Molybdenum, 99% | $3.00 to $3.25 |
| Nickel, unannealed | $1.00 |
| Nickel, annealed | $1.06 |
| Nickel, spherical, unannealed, #80 | $1.18 |
| Silicon | 43.50¢ |
| Solder powder | 7.0¢ to 9.0¢ plus met. value |
| Stainless steel, 302 | 99.0¢ |
| Stainless steel, 316 | $1.32 |
| Tin | 14.00¢ plus metal value |
| Tungsten, 99% (65 mesh) | $4.50 |
| Zinc, 10 ton lots | 18.75¢ to 32.50¢ |



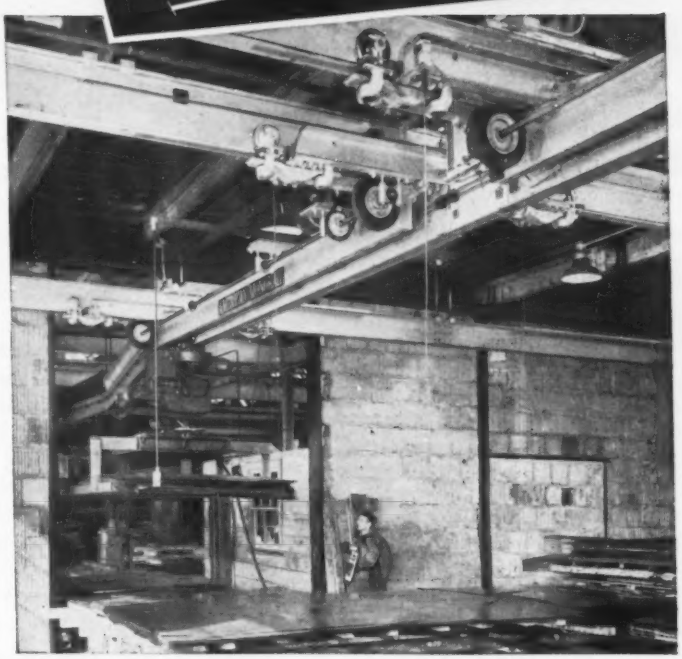

# handles 200 tons more steel per day with AMERICAN MONORAIL

The Hamilton Steel Products Company of Chicago now handles 250 tons of sheet steel per day with American MonoRail cranes as compared to 50 tons by previous methods. An increase of 400%.

This is just another example of cost savings with improved handling methods which are regularly realized by American MonoRail users. If you have a materials handling problem call your American MonoRail representative or write us today.

Send for Bulletin SC-1.

**Member of Materials Handling Institute and MonoRail Association**



AMERICAN OVERHEAD HANDLING EQUIPMENT

**MONORAIL COMPANY**

13103 ATHENS AVENUE
CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

# No sudden shipping bottleneck here . . .

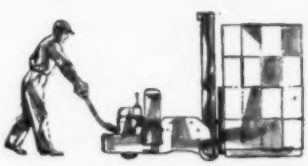
## because no sudden failure here

*an EDISON battery won't let you down*

In the hustle-bustle of shipping departments, time is doubly precious. That's why so many companies depend on industrial trucks powered with EDISON batteries to make every second count. Shipments get out on time . . . costly tie-ups are eliminated . . . man-hours are saved because EDISON batteries incorporate every feature to assure "no sudden failure."

Because of their strong all-steel cell construction, EDISON batteries withstand abnormally rugged working conditions. They are electrically foolproof too . . . can be charged rapidly at full normal rate up to and including end of charge.

When developing them, Thomas A. Edison considered economy as well as dependability. And test after test proves that an EDISON costs less to own and operate. Today there's an EDISON battery for your material handling need—from small "walkies" to big ram trucks. Ask your local Edison field engineer to help you choose the one best for you. Or write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, N. J.



THE TRUCK THAT NEVER LETS YOU DOWN IS ELECTRIC

Quiet, clean, smooth, safe, low-cost electricity is also the most dependable power for industrial trucks. For any stop-and-go material handling job, instant on-off EDISON battery power in an electric truck is the most dependable and economical combination.

You get more dependable power—lower over-all cost with

**EDISON**
*NICKEL – IRON – ALKALINE*
STORAGE BATTERIES

Use your AIM*... Pittsburgh Steel did ...

## Hydraulic strapping tools package special steels safely

**PITTSBURGH STEEL** integrated a packaging idea with production of high quality steel—and achieved a fast, safe, efficient shipping procedure. (Idea No. U6-4)

Cut-to-length sheets flow directly to a centralized packaging station. Heavy duty steel strapping is applied, tensioned, sealed and cut with the latest Acme Steel hydraulic power equipment. Strap is fed from an electrically powered dispenser. Operator fatigue is reduced—tension is predetermined—bundles are uniformly tight.

Acme Idea Man R. J. Henkel helped Pittsburgh Steel get top packaging performance

***Use YOUR Acme Idea Man** to be sure of getting the best in packaging and shipping ideas. You can reach him by calling the nearest Acme Steel office or write Acme Steel Company, Dept. EF-66, 2840 Archer Avenue, Chicago 8, Illinois.

**ACME STEEL STRAPPING**

ACME STEEL

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## PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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Capacity 1¼" X 12'

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Light and heavy machinery for all classes of sheet metal, plate and structural work.

**BERTSCH & COMPANY,** CAMBRIDGE CITY INDIANA

*more and more manufacturers are saying:* "Let's use

# GRIFFIN®
## COLD ROLLED STRIP STEEL"

Made to your specifications in all thicknesses from .012 to .375 inches and widths from ⅛" to 19" depending upon gauge.

***NARROW ROLLED ROUND EDGE STRIP STEEL*** *In stock at*
CENTRAL STEEL & WIRE CO.
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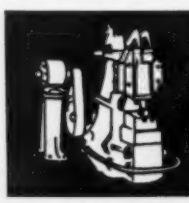
*"since 1898"*
MANUFACTURING CO. ERIE, PA.

## *New* ARMSTRONG *Adjustable Step Block*

ARMSTRONG Adjustable Step Blocks provide safe, rigid, easily adjustable support for setting-up work. Eliminate haphazard set-ups, save time and labor.

**ARMSTRONG BROS. TOOL CO.**
*"The Tool Holder People"*
5209 W. Armstrong Ave., Chicago 30, U.S.A.

Write for Catalog showing complete System of Armstrong Set-Up and Hold-Down Tools.



## BRADLEY FORGING HAMMERS

Since 1832
Upright Strap Compact
Cushioned Helve • Upright Helve
Nine Sizes from 15 lbs. to 500 lbs.
Capacity to 5" —Speeds to 500 blows per min.

C. C. BRADLEY & SON
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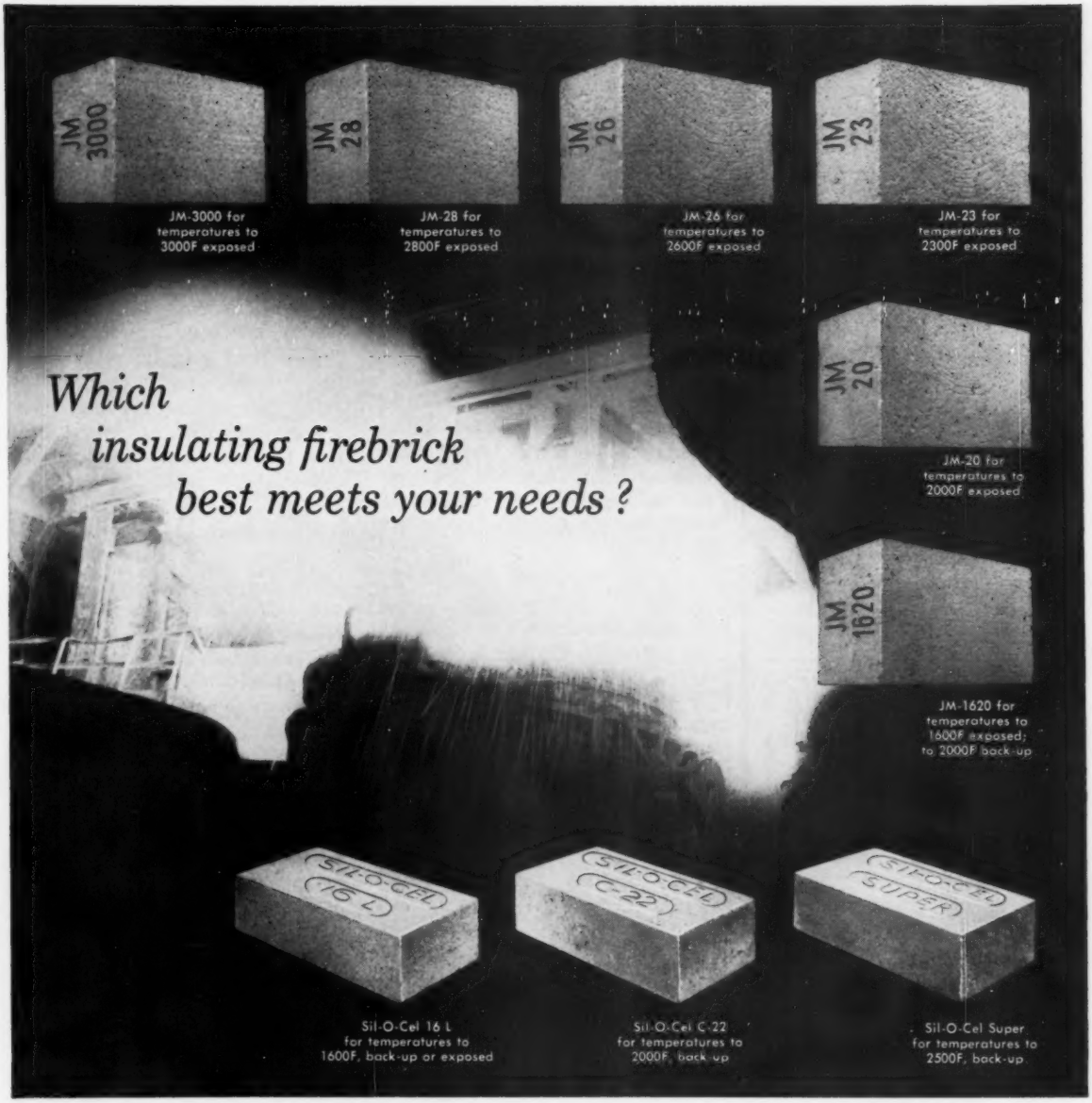
DIVISION OF HARSCO CORPORATION


JM 3000
JM-3000 for temperatures to 3000F exposed
JM 28
JM-28 for temperatures to 2800F exposed
JM 26
JM-26 for temperatures to 2600F exposed
JM 23
JM-23 for temperatures to 2300F exposed
Which insulating firebrick best meets your needs ?
JM 20
JM-20 for temperatures to 2000F exposed
JM 1620
JM-1620 for temperatures to 1600F exposed; to 2000F back-up
SIL-O-CEL 16 L
Sil-O-Cel 16 L for temperatures to 1600F, back-up or exposed
SIL-O-CEL C-22
Sil-O-Cel C-22 for temperatures to 2000F, back-up
SIL-O-CEL SUPER
Sil-O-Cel Super for temperatures to 2500F, back-up

## Only Johns-Manville's insulating brick family offers the right combination of properties . . . *for furnace requirements to 3000F!*

**J-M's nine *different*** insulating firebrick* means you never have to settle for a brick that's nearly right! Instead, you choose the one brick that best meets your needs . . . for such important properties as temperature resistance, load-bearing strength, conductivity and density.

Johns-Manville has two strategically located plants for the production of insulating brick: Lompoc, California, and Zelienople, Pennsylvania. Brick are available from the stocks of authorized Johns-Manville distributors in key industrial areas.

For complete information, call your nearest J-M representative. Or write for brochure IN-115A to Johns-Manville, Box 60, New York 16, New York. In Canada, Port Credit, Ontario.

**Sil-O-Cel® Super and C-22 insulating brick are for back-up use only*

JM **Johns-Manville** REFRACTORY AND INSULATING REFRACTORY PRODUCTS

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Used - As Is - Reconditioned

## RAILWAY CARS

All Types

SERVICE-TESTED ®

## FREIGHT CAR REPAIR PARTS

For All Types of Cars

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Diesel, Steam, Gasoline, Diesel-Electric

35 — ALL-STEEL ORE CARS, HOPPER TYPE

40 and 50-ton capacity

Excellent condition. Immediate delivery!

## RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon Cleaned and Tested

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Overhead and Locomotive

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Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"


# THE CLEARING HOUSE

## News of Used and Rebuilt Machinery

**Slow Motion . . .** Used machinery dealers in the **Detroit** area are tightening their belts. The market is beginning to feel the effects of automotive production cutbacks. Dealers report that the month of May was the slowest so far this year.

Auto subcontractors, one of the biggest markets for used equipment, are presently loaded with finished parts. Thus, both the need and the urge to invest in new and better equipment has gone by the boards.

**Warm Weather Letdown . . .** The brisk pace that was set earlier in the year and reached a crest in April, slowed to a walk last month.

With warm weather finally starting to arrive and the vacation season just around the corner, most dealers believe that their business is going to remain slow right through the rest of the summer.

In addition, most tool and die shops, although still going strong, are winding up their work on the 1957 auto program.

**Squeeze Is On . . .** In the meantime, customers are becoming more price conscious every day. The amount of bargaining depends on how badly the machine is needed.

Dealers report that their inventories are low and are still blaming high prices. More than one dealer has felt the effects of the cost-price squeeze and they complain that the margin of profit is steadily declining on every piece of equipment sold.

Although there has been a general drop in activity here, it hasn't reached the disastrous stage.

**Silver Lining . . .** As always, there is a good market for tool room equipment. This includes the usual run of jig borers, radial drills and heavy lathes. There is also a demand for spot welders and heavy presses.

And there are other bright spots on the horizon. It is felt that once the summer season is over, business will pick up again. One of the reasons will be the start of production of 1957 cars.

Also, another dealer points out that a steel price increase could help his business. He reasons that small companies that have been looking for new equipment will now consider used machinery in order to save money.

**Uncle Sam's Aid . . .** Defense contracts could also give the machinery business a shot in the arm. It is possible that the demand for equipment could increase as the number of defense jobs in the area grow.

However, most dealers are cautious about this. They figure that small shops will be using equipment they already have and, except for a few cases, will not need any more machinery.

The number of inquiries from outside the state has also dwindled, although they are coming in at a steady rate.

"We can't take your blood. It's fifty percent cutting oil."

# CONSIDER GOOD USED EQUIPMENT FIRST

**BENDER**
#500 Wallace Hydr. Bender 180°, Cap'y 2½"
**BENDING ROLLS**
6' x 3/16" Niagara, Initial Type
10' x 10 Ga. Bertsch, Initial Type
12' x ⅜" Cleveland Pyramid Type
10' x ¾" Niles Pyramid Type
27' x 1" Southwark Pyramid Type
**BRAKES—LEAF TYPE**
10' x 10 Ga. Dreis & Krump No. 204
10' x 16 Ga. Dreis & Krump Hand Operated
12' x ⅜" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven
**BRAKE—PRESS TYPE**
12' x 3/16" Cincinnati
**BULLDOZERS**
#5 Williams & White, 20" Stroke, 11½" x 63" Face of Crosshead
#27 Williams & White, 22" Stroke 16" x 80" Face of Crosshead
**CRANES—OVERHEAD ELECTRIC TRAVELING**

| | | |
|---|---|---|
| 5 ton P&H | 25' Span | 230 Volt D.C. |
| 5 ton Shepard Niles | 55' Span | 220 Volt D.C. |
| 5 ton P&H | 80' Span | 220/3/60 A.C. |
| 5 ton P&H | 80' Span | 500/3/60 A.C. |
| 5 ton Cleveland | 96' Span | 230 Volt D.C. |
| 10 ton Cyclops | 40' Span | 220/440 A.C. |
| 10 ton P&H | 77' Span | 230 Volt D.C. |
| 10 ton Milwaukee | 80' Span | 230 Volt D.C. |
| 10 ton P&H | 96' Span | 220 Volt D.C. |
| 50 ton Hand Oper. | 100' Span | |
| 120 ton Whiting | 80' Span | 220/3/60 A.C. |

**CUT OFF MACHINES**
Yoder AD-2 Cut-off, Max. Capacity ⅝" O.D.
Yoder Type L Flying Cut-Off, Cap'y ⅝" to 3" Tubing
**FORGING MACHINE**
1" to 5" Acme, Ajax, National
**HAMMERS BOARD DROP— STEAM DROP STEAM FORGING—600 lb. to 20,000 lb.**
**LATHE—TURRET**
#2A Warner & Swasey Univ. Type M 510 Preselector Head. LATE
**LEVELLERS—ROLLER**
60" United 17 Rolls 3¾" Dia.
72" McKay 17 Rolls 4¼" Dia.
84" McKay Type E, 17 Rolls 5¼" Dia.
**MULTI SLIDE MACHINE**
No. 35 U. S. Multi Slide Machine with Edgewise Stock Straightener
**PLANER—OPEN SIDE**
48" x 48" x 12' Cincinnati, Three Head
**PRESSES—HYDRAULIC**
530 ton Baldwin Southwark 12" stroke 48" x 25" Between Columns
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
4500 ton B-L-H Hydr. Forging Press
**PRESS—STRAIGHT SIDE**
Clearing Model TF41500-20b Triple Acting Strokes 40, 32, 14", Bed Area 100" x 200"
**PUNCH & SHEAR COMBINATIONS**
Style EF Cleveland 36" Throat, Punch 1¼" thru 1" Style W Cleveland 60" Throat, 312 Ton
#1½ Buffalo, Notcher, Punch 1-1/16" x ⅝", Shear Angles 4 x 4 x 9/16", etc.
Pels LUSEFF, Punch 1⅝" x 1", Shear Angles 6 x 6 x ⅝", Rd. 2½", Sq. 2⅜", etc.
**ROLLING MILLS**
10" x 16" Single Stand, Two High
12" x 16" Phila. Single Stand, Two High
12" x 20" Standard Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill
26" x 54" United Single Stand, Two High
8" Torrington Ring Type Reversing Mill For cold reducing 7" wide strip
**ROLLS FORMING**
8 Stand Maplewood, Spindle 2" Dia., 12" Dist. between spindles
**SHEAR—BAR**
Pels Type 18-23, Capacity 2" Rd., 1⅜" Sq.
**SHEAR—BILLET**
No. 7 Hilles & Jones, Motor Drive, Cap. 5" Sq.
**SHEARS—GATE**
80" x ⅜" Pels
86" x 1" Hilles & Jones
**SHEAR—ANGLE**
6 x 6 x ⅝" Cleveland
**SHEARS—SQUARING**
12' x ⅜" Niagara, NEW 1951
12' x ⅝" Steelweld
**SLITTERS**
36" Yoder Slitting Line
6-48 Yoder Gang Slitter, 5" Threaded Arbor
**STRAIGHTENERS**
Kane & Roach 2 Roll Rotary Straightener, M.D. Capacity Mildsteel ¼" to ⅞"
Kane & Roach 5 Roll #5250-B, Capacity ⅜" to 2½" solid, 4¼" Tube
Aetna Standard 12 Roll Straightener, Capacity 2"
**SWAGING MACHINE**
#6½A Fenn, Capacity 2¼" Tube, 2¾" Solid 19" Die Length, Hydraulic Feed. LATE
**TESTING MACHINES**
60,000, 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb. Compression

• Manufacturing • Equipment •

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*GUARANTEED*
## ELECTRIC POWER EQUIPMENT

**D. C. MOTORS**

| Qu. | H.P. | Make | Type | Volts | RPM |
|---|---|---|---|---|---|
| 1 | 2200 | G.E. | MCF | 600 | 400/530 |
| 1 | 1200 | G.E. | MCF | 600 | 650/800 |
| 1 | 1000 | G.E. | MCF | 600 | 350/700 |
| 1 | 940 | Whse. | QM | 250 | 140/170 |
| 1 | 800 | Whse. | | 250 | 450/550 |
| 1 | 500 | Whse. | CC-216 | 600 | 300/900 |
| 1 | 500 | G.E. | MCF | 230 | 250/750 |
| 3 | 450 | Whse. | | 550 | 415 |
| 1 | 250 | G.E. | MPC | 230 | 400/600 |
| 1 | 200 | G.E. | CD-1650Z | 220 | 500/1500 |
| 1 | 200 | Whse. | CB-5113 | 250 | 400/800 |
| 1 | 150 | G.E. | | 600 | 250/750 |
| 1 | 150 | Cr. Wh. | 65H | 230 | 1150 |
| 2 | 150 | Cr. Wh. | 83H-TEFC | 230 | 890 |
| 1 | 150 | Whse. | SK-151B | 230 | 900/1800 |
| 1 | 150 | Whse. | SK-201 | 230 | 360/950 |
| 1 | 120 | G.E. | MCF | 230 | 250/1000 |
| 1 | 125 | Whse. | SK-183 | 230 | 850 |
| 2 | 100 | Whse. | SK-181 | 230 | 450/1000 |
| 2 | 75 | C.W. | 53H-TEFC | 230 | 860 |
| 1 | 50 | G.E. | MD-412AE | 230 | 550 |
| 1 | 50 | Whse. | SK-131.5 B.B.D.P. | 230 | 600/2200 |

***M-G Sets—3 Ph. 60 Cy.***

| Qu. | K.W. | Make | RPM | D.C. Volts | A.C. Volts |
|---|---|---|---|---|---|
| 1 | 3000(3U) | G.E. | 514 | 600 | 4000/6900/ 13200 |
| 2 | 2000/2400 | G.E. | 450 | 250/300 | 2300/4600 |
| 1 | 1750/2100 | G.E. | 514 | 600 | 4000/6900/ |
| 1 | 2000 | G.E. | 500 25cg | 660 | 11000 |
| 1 | 2000 | G.E. | 514 | 600 | 2300/4600 |
| 1 | 1500 | G.E. | 720 | 600 | 6600/13200 |
| 1 | 1250 | Whse. | 720 | 600 | 2300 |
| 1 | 750 | Whse. | 900 | 250 | 2300/4000 |
| 1 | 500 | Whse. | 900 | 125/250 | 440 |

**TRANSFORMERS**

| Qu. | KVA | Make | Type | Ph. | Voltages |
|---|---|---|---|---|---|
| 1 | 3000 | A.C. | OISC | 3 | 33000x2300 |
| 1 | 2500 | A.C. | Furnace | 3 | 13800x147/113.5 |
| 1 | 2500 | A.C. | OISC | 3 | 34520x13800 |
| 3 | 1000 | G.E. | HVDDJ | 1 | 2400x480 |
| 6 | 1000 | Wagner | OISC | 1 | 13200x460 |
| 3 | 667 | G.E. | HD | 1 | 13800x2300 |
| 3 | 500 | Kuth | OISC | 1 | 13200x6600 |
| 3 | 333 | G.E. | HS | 1 | 7200x2400/4160Y |
| 3 | 333 | G.E. | HD | 1 | 13200x2300 |
| 3 | 333 | G.E. | HSWR | 1 | 2300/4000x230/460 |
| 1 | 300 | G.E. | HT | 3 | 4160x480/277 |
| 3 | 200 | Whse. | OISC | 1 | 13200x120/240 |
| 3 | 200 | G.E. | HKS | 1 | 4800/2400x230/460 |

## BELYEA COMPANY, INC.

*47 Howell Street, Jersey City 6, N. J.*

---

## SELECT MACHINE TOOLS

**GRINDING MACHINES**
72" Hanchett 3-spd. rotary surface, new 1946.
13" x 60" Model 300 Hanchett vert. spdl., late.
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
30" No. 10 Blanchard rotary surface, new 1941.
No. 72A5 Heald hyd. pl. internal, extended bridge, 1943.
No. 74 Heald hyd. pl. internal, X-sliding H.S., 1941.
No. 72A3 Heald hyd. pl. internal, X-sliding H.S. 1941.
12" x 24" Cincinnati ER hyd. universal cyl., 2U3BIH-5.
14" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Filmatic pl. cylindrical, 1942.
**HAMMERS**
No. 6-I Nazel, pneumatic, late.
No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.
**LATHES**
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
24" x 8' LeBlond H. D. engine lathe.
14" x 6' Hendey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.
126" x 96' CC Niles Bement Pond engine lathe, 80 HP M.D.
90" swing Betts Bridgeford H. D. engine lathe, late.
**PLANERS**
36" Rockford Hyd. Openside Shaper-Planer.
42" x 42" x 12' Liberty dbl. housing planer, 35 HP M.D.
48" x 48" x 10' Gray Maxi-Service.
**PRESSES**
90 ton No. 92½C Toledo D.C. Str. Side.
250 ton No. 7951½-72 Toledo D.C. Toggle drawing.
500 ton No. 1039 Hamilton D. C. adj. bed, 60" x 102".
2000 ton No. 6 National Maxidress Forging Press.
**SHAPERS & SLOTTERS**
24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D., late type.
36" Rockford openside hyd. shaper-planer, ser. 39HU35.
36" Rockford hyd. vertical slotter, new 1944.
**UPSETTERS**
3½" Ajax suspended slides, steel frame.
1½" National Upsetter, guided ram, hard ways.
2" National Upsetter, guided ram, air clutch.

**1000 Tools in Stock**
**Free Illustrated Catalog**

## MILES MACHINERY CO.

PHONE SAGINAW 2-3105
2041 E. GENESEE AVE. SAGINAW, MICH.

---

**MOTOR GENERATOR SETS**

| Qu. | KW | Make | R.P.M. | D.C. Volts | A.C. Volts |
|---|---|---|---|---|---|
| 1 | 2500 | Whse. | 720 | 600 | 4160/2300 |
| 1 | 2000 | Al. Ch. | 720 | 250 | 4160/2300 |
| 1 | 1200 | Whse. | 720 | 600 | 2300 |
| 1 | 1120 | Elliott | 720 | 580/250 | 2300 |
| 1 | 500 | G.E. | 1200 | 250 | 2300/440 |
| 1 | 500 | Cr. Wh. | 720 | 575/600 | 2300/440 |
| 1 | 300 | G.E. | 1200 | 250/275 | 2300 |
| 1 | 200 | Elliott | 1200 | 125 | 4000/2300 |
| 3 | 150 | G.E. | 1200 | 250 | 2300/440 |
| 1 | 120 | Whse. | 1200 | 250 | 2300/440 |
| 1 | 100 | Al. Ch. | 1200 | 250 | 4000/2300 |

**LARGE MILL TYPE MOTORS**

| Qu. | HP | Make | R.P.M. | Volts | Type |
|---|---|---|---|---|---|
| 1 | 3000 | Whse. | 600 | 525 | Tandem |
| 1 | 1500 | Whse. | 600 | 525 | Rev. |
| 1 | 700 | Al. Ch. | 135 | 230 | Mill |
| 2 | 600 | Al. Ch. | 300/600 | 600 | Mill |
| 2 | 600 | Whse. | 110/220 | 230 | Mill |
| 1 | 450 | Whse. | 450/900 | 230 | BK. |
| 1 | 800 | Whse. | 800 | 230 | Mill |
| 4 | 275 | Whse. | 425/850 | 230 | QM-600.6 |
| 1 | 150 | Whse. | 360/720 | 600 | QM-600.8 |

**SLIP RING MOTORS**
**Constant Duty 3 Phase 60 Cycle**

| Qu. | HP | R.P.M. | Make | Type | Volts |
|---|---|---|---|---|---|
| 1 | 100 | 430 | Al.Ch. | | 440/220 |
| 2 | 100 | 495 | G.E. | 1-15A-M | 2300 |
| 1 | 100 | 900 | El. Dy. | | 2300 |
| 1 | 100 | 1200 | Whse. | CW | 440/220 |
| 1 | 194 | 870 | Whse. | CW | 440/220 |
| 1 | 125 | 600 | G.E. | 1-14-M | 2200 |
| 1 | 150 | 450 | Whse. | CW-1000 | 440 |
| 1 | 150 | 490 | Whse. | CW | 440/220 |
| 1 | 150 | 585 | Whse. | CW | 4160/2300 |
| 1 | 150 | 720 | Al. Ch. | ARY | 440/220 |
| 1 | 200 | 435 | G.E. | I-M | 440 |
| 1 | 200 | 490 | G.E. | I-14-M | 2200 |
| 2 | 200 | 585 | G.E. | I-12-M | 2200 |
| 1 | 250 | 380 | G.E. | MT-414 | 2200 |
| 1 | 250 | 720 | Al. Ch. | ARY | 440 |
| 1 | 350 | 360 | Whse. | CW | 2300 |
| 1 | 400 | 360 | G.E. | MT-424 | 2300/440 |
| 1 | 400 | 500 | Al. Ch. | ARY | 2200 |
| 1 | 425 | 392 | G.E. | I-M | 440 |
| 1 | 450 | 440 | Whse. | CW | 2200 |
| 1 | 450 | 514 | G.E. | I-M | 2200 |
| 1 | 500 | 450 | G.E. | I-M | 2300 |
| 1 | 500 | 514 | Al. Ch. | ANY | 2300 |
| 1 | 700 | 295 | Whse. | CW | 2300 |
| 1 | 750 | 400 | G.E. | I-M | 2300 |
| 1 | 1000 | 445 | Whse. | CW | 2300 |
| 1 | 1250 | 502 | Whse. | CW | 6600 |
| 1 | 1500 | 360 | G.E. | MT | 2300 |
| 1 | 1800 | 270 | Whse. | Mill type | 6600 |
| 1 | 2500 | 257 | G.E. | Mill type | 6800 |

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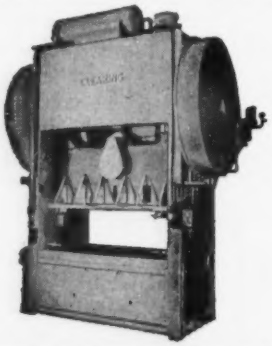

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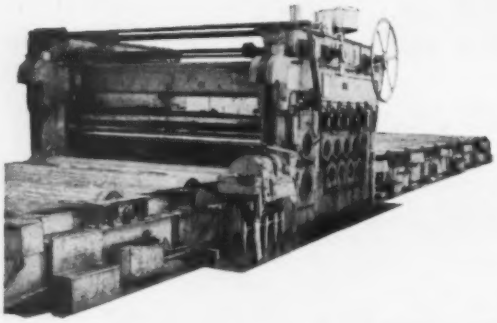

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## CONTRACT MANUFACTURING DIRECTORY

**The directory of production services. (This section appears in the first and third issues of each month.)**

## METALWORKING BRIEFS

### Steel Labor Puts On The Pressure

Steel labor is set to strike July 1 barring a new agreement with steel firms. Union's wage policy committee has authorized a walkout when present contracts expire. Meanwhile, it pledges to bargain "day and night" if necessary to work out a compromise between its demands and steel firms' counter-proposals. (See page 59.) David J. McDonald, union president, indicates he would be amenable to a 3-year agreement providing it calls for something he could "live with." Mills would have to start shut-down next week if no agreement is reached.

### Chemical Industry Plans Expansion

The chemical industry will spend an estimated $1.6 billion on new construction during 1956 and 1957. Privately financed projects last year totaled $772 million. Total tab for new construction last year plus projects either now underway or planned for '56 and '57 is $2.3 billion, according to a survey by Manufacturing Chemists' Association.

### A-L Starts Vacuum Melting Shop

Allegheny Ludlum Steel Corp. has started a new induction vacuum melting department at Watervliet, N. Y. New facility has a 300 lb furnace which will be used for research. This will be replaced eventually by a 2000 lb furnace. Allegheny recently doubled its remelting capacity through addition of two consumable electrode furnaces.

### Home Building Picks Up Slightly

New home starts in May totaled 107,000. This is a slight increase from the 105,000 started in April and continues the annual rate of 1.1 million. In May, 1955, 130,500 private homes were started.

### J & L Spends $2 million on Air Cleanup

Pittsburgh Works of Jones & Laughlin Steel Corp. will get a $2 million program "to bring about further elimination of air pollution." Major part of appropriation, $1,200,000, will be spent on the first stage of installing electrostatic precipitators on furnaces in the South Side openhearth shop.


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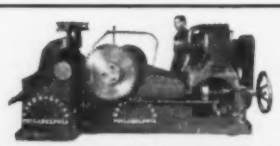
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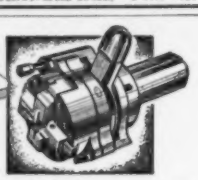
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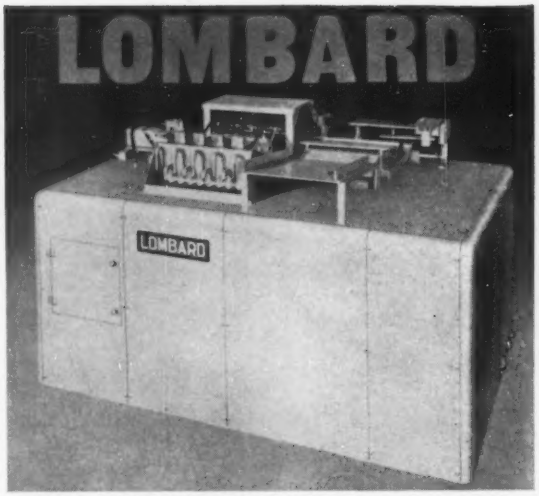


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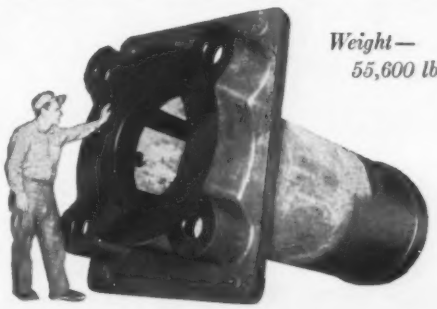

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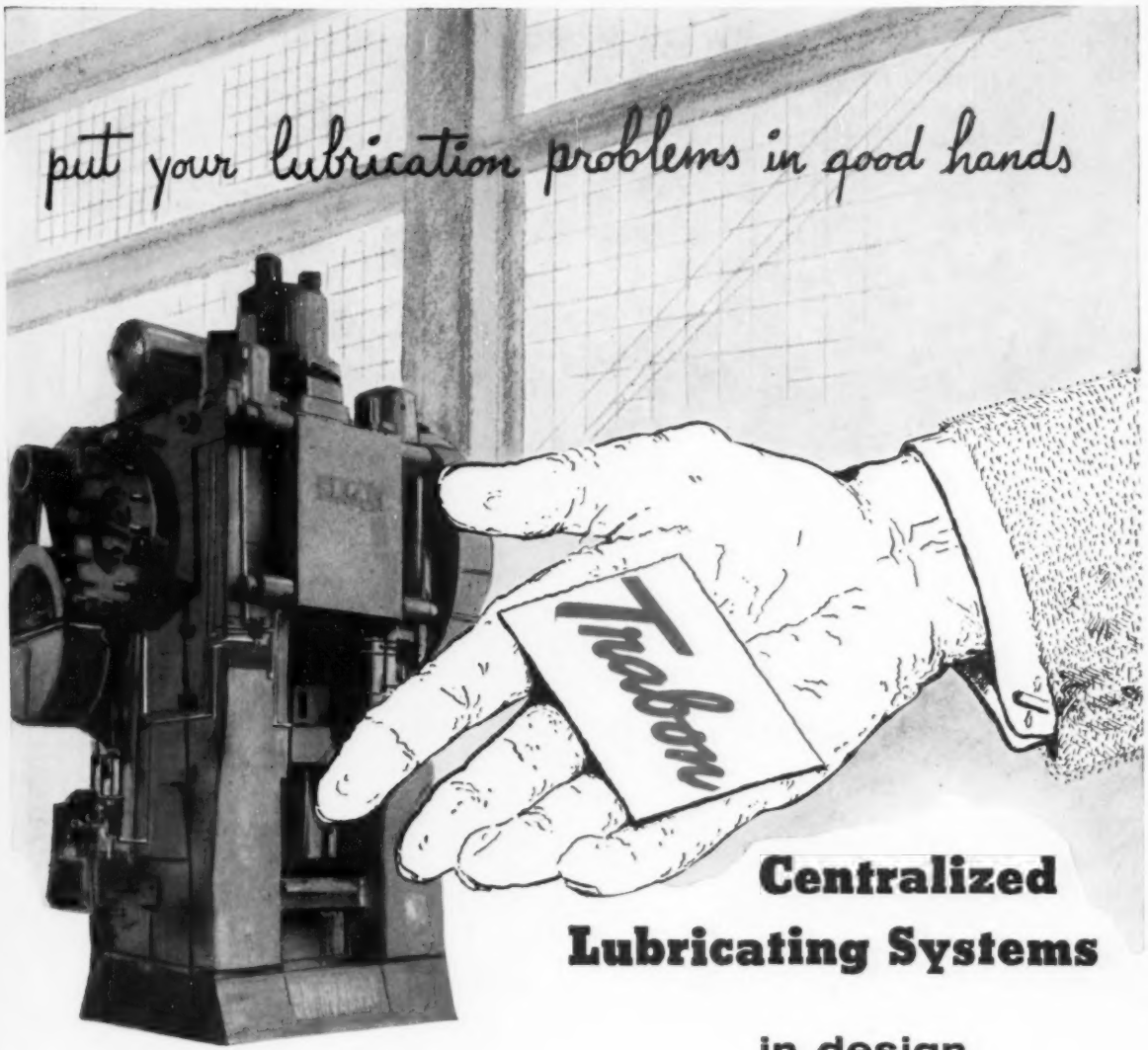


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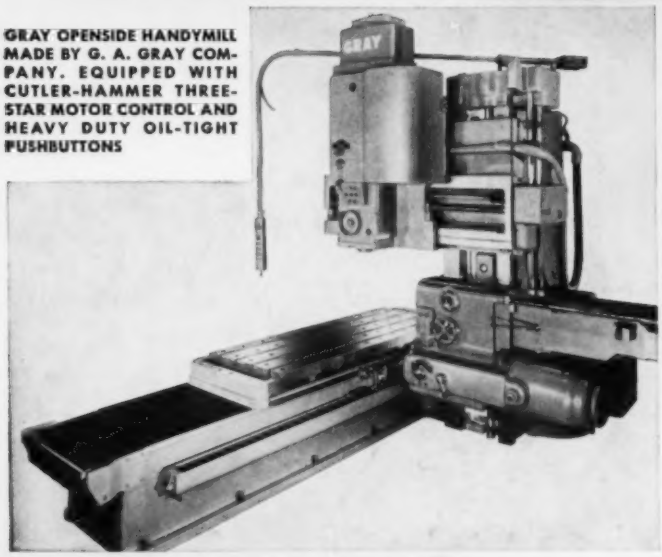
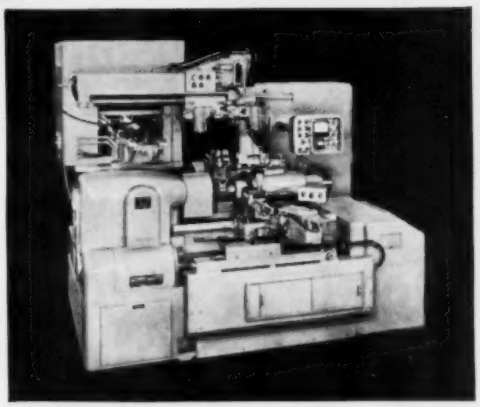
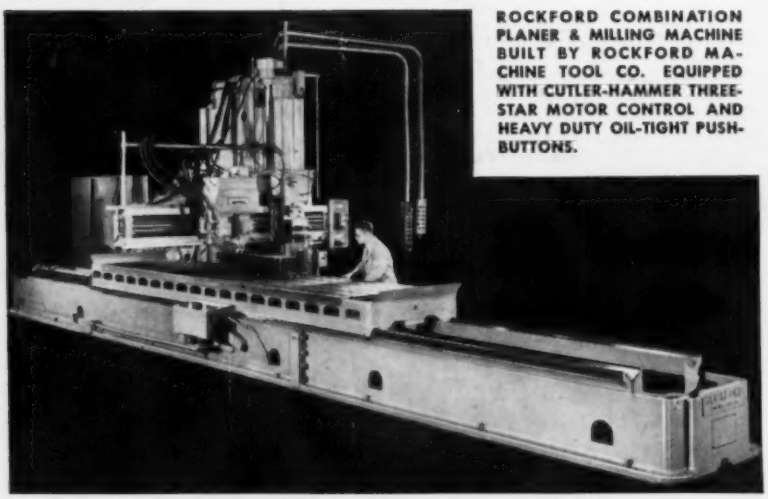


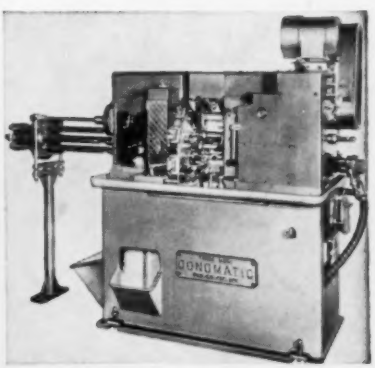

GRAY OPENSIDE HANDYMILL MADE BY G. A. GRAY COMPANY. EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS



MONARCH MODEL 21 MONA-MATIC LATHE WITH AUTOMATION BUILT BY THE MONARCH MACHINE TOOL CO. EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL.



ROCKFORD COMBINATION PLANER & MILLING MACHINE BUILT BY ROCKFORD MACHINE TOOL CO. EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS.




MODEL TK CONOMATIC AUTOMATIC LATHE MADE BY CONE AUTOMATIC MACHINE COMPANY, INC. EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS.

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